TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I (*AR 502*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. Explain, in brief, GREEK AGORA and GREEK TEMPLES with reference to ORDERS and SYMBOLISM used in Greek architecture. [16]
2. Explain the Engineering achievements of ROMANS with example of PANTHEON, PUBLIC BATHS and ROMAN HOUSES. Concentrate on materials used and technological innovations. [16]
3. Write short notes on: (Any Four) [4×4]

   a) Stonehenge at Salisury (Prehistoric period)
   b) Key Features of Gothic Architecture (Gothic Architecture)
   c) Indus Valley Civilization (South Asian Eastern Civilization)
   d) Buddhist Monastery (Buddhist Rock cut Architecture)
   e) Chinese Architecture (Chinese Architecture)
   f) Stupa Of Borobudur (Indonesian Architecture)

4. Discuss in detail the Greek sanctuaries and temple architecture in terms of location, evolution of temple form, material used and building techniques with necessary sketches. [16]
5. Compare and contrast the late Mugal architecture with early Mughal architecture in terms of building form, decore, material used and construction technology. [16]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	**Full Marks**	80
Programme	BAR	**Pass Marks**	32
Year / Part	II / I	**Time**	3 hrs.

Subject: - History of Architecture I *(AR 502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain in brief with examples, the architectural development in Stone Age. Discuss about the architecture of Stonehenge. [10+6]
2. Make a comparative analysis with examples between spatial layouts, characteristics features of art and craft works, chronological development, architectural symbolism of North Indian Temple architecture and south Indian architecture. Discuss in detail about Kailasa temple (cave 16) of Ellora. [10+6]
3. Write a detailed explanation of Roman technological achievements and its manifestation in roman public architecture. Support your answers with illustrative examples. [16]
4. Explain the chronological development of Egyptian funerary Architecture with regards to the social beliefs, form development and construction technology. [16]
5. Write short notes on: (Any Four) [4×4]
   a) Gothic Architecture
   b) Roman Bath
   c) Parthenon
   d) Great Sphinx
   e) Renaissance in Architecture

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR 502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain EVOLUTION OF CHURCHES from Basilica to Renaissance in its BUILDING FORM and BUILT ENVIRONMENT. [16]
2. Take an example of AGRA FORT to explain Muslim Architecture of Mughal period in India. [16]
3. With reference to the tomb architecture, discuss the Egyptian experimentation in funerary architecture, in terms of socio-economic condition, it's form, material used and construction technology. [16]
4. Write short notes of the following topics. [4×4]
   a) Stonehenge
   b) Bazyantine dome
   c) Flying buttress
   d) Dome of florance
5. With reference to the Mahabalipuram area, discuss the pallavas experiment with temple form. [16]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAE	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR 502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *Attempt any **Five** questions selecting at least **Two** from **Each Part** compulsory.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*
- ✓ *Use sketches to illustrate your answer as appropriate.*

Part A

1. With a reference of Egyptian Pyramid of GIZA, Explain funeral architecture and its developments with respect to form, function, construction materials and influences on society and culture. [16]
2. Explain, in brief, the excellence of Greek orders, symbolism and Layout. Take references to various structures available in Acropolis of Athens. [16]
3. Discuss Roman Architecture and Technological innovations with respect to public Bath, Amphitheatre and Forum. Explain how Roman society contributed to evolve these structures. [16]
4. Explain, in brief, the development of CHURCHES from early Christian Basilica to Classical renaissance. Take St. Peter's, Rome as an example to explain. [16]

Part B

5. Write in brief the evolutions of Hindu Temples from Chalukyan to Hindu Rock Cut period. Take reference to plan form, formation of roof, and decorative features. [16]
6. Take example of Fatephur Sikri to explain Muslim Architecture of Mughal period in India. [16]
7. Write Short notes on:*(Any Four)* [4x4]
   a) Gothic structural system
   b) Hagia sophia
   c) Indus valley
   d) Buddhist Chaitya hall
   e) Japanese architecture

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*
- ✓ *Support your answer with necessary sketches.*

1. What do you understand by Funerary Architecture? Write about various forms of Egyptian Funerary Architecture with regards to the form, structural considerations and socio-cultural implications. [16]
2. Compare between the temple architecture developed by the Greeks and the Romans. Support your answer with suitable illustrative examples. [16]
3. Write about the evolution of Vimana, Gopuram and Prakarams in south Indian Hindu Architecture. Support your answer with illustrative sketches of relevant example. [16]
4. What are the distinctive characteristics of Mughal Tomb Architecture? Describe this form of architecture in terms of planning, materials, surface decoration and elemental forms. [16]
5. Write short notes on: (any four) [4×4]
   i) Great Bath of Mohenjodaro
   ii) Karle Chaitya Hall
   iii) Features of Romanesques Churches
   iv) Hagia Sophia
   v) Japanese Pagoda

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Ashmita Verma

13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Describe in detail the development of Egyptian tomb architecture. What materials and technology were prevelant at that time? Write with proper examples.
2. Compare and contrast the Greek Agora with Roman Forum. Describe their similarity with the medieval open spaces of Kathmandu valley.
3. Explain how material used and know how technology influence the Greece and Roman temple architecture.
4. Discuss in detail the rock cut experimentation done in Hindu architecture through chalukyam to pallava a period in terms of form cutting technology etc.
5. Write about the contributions made by Akbar to the Mughal architecture. Write with reference to the Fatehpur Sikri.
6. Write short notes on:
   i) Gothic church form
   ii) Indus city planning
   iii) Buddhist chaitya halls
   iv) Flying Butress
   v) Stupa of Borobudur

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Write about the various stages of development of Egyptian temple architecture. Write with reference to their form development, material and technology implied.
2. With reference to the Acropolis of Athens, Write about the temple architecture developed during the Greek period.

OR

Explain the Roman achievements in public architecture with special reference to space planning, materials and technological innovations. Support your answer with necessary examples.

3. Write about the development of Hindu built temple architecture through Gupta to Nayak period with special reference to the configuration of spaces architectural detailing, roof design and decorative features.
4. With reference to the tombs of Humayun and Taj Mahal, Write about the mughal tomb architecture in terms of setting, form and material used and construction technology.
5. Write short notes on: (any four)
   a) Features of Gothic churches
   b) The Byzantine Dome
   c) Aryan architecture
   d) Florence Cathedral
   e) Japanese Pagoda Architecture

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13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions selecting Three from Group A and Two from Group B.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

Group A

1. Discuss the progressive development of Egyptian Pyraid Architecture in terms of socio-cultural beliefs, materials used, construction technology and architectural merit. [16]
2. Compare and contract the temple architecture developed by the Greeks and Romans with reference to elemental details, space conception and technological innovations. Support your answer with relevent examples. [16]
3. Explain in detail, how the social condition, material knowhow and technological invention did influence the Roman Forums and Greek Agora. [16]
4. Write short notes on: [4×4]
   i) Hagia Sophia
   ii) Romanesque Vault
   iii) Gotheic architecture
   iv) St.peter's church

Group B

5. With reference to the tombs of Humayun and Taj Mahal, describe the Mughal tomb architecture in terms of planning, stylistic sources, elemental details and construction technology. [16]
6. Discuss in detail the development tendency of Indian Hindu temple (freestanding) architecture in terms of plan and formation of roof with necessary sketches. [16]
7. Write short notes on: (any four) [4×4]
   i) Indus City Planning
   ii) Karle Chaitya Hall
   iii) Vastupurusha Mandala
   iv) Stupa of Borobudur
   v) Japanese Pagoda

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Five questions selecting Three from Group A and Two from Group B.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Use sketches to illustrate your answers where appropriate.*
- ✓ *Assume suitable data if necessary.*

Group A

1. Discuss in detail the development of Egyptian funerary architecture in terms of it's form, material used and construction technology with necessary sketches. [16]
2. Describe in detail the unique feature of Greek classical architecture. Explain their beginnings and development. [16]
3. Explain how social-economic condition, material used and know how technology influenced the Roman architecture. [16]
4. Write short notes on: (any four) [4×4]
   a) Stonehenge
   b) Byzantine dome
   c) Gothic church architecture
   d) St. peter Rome
   e) Palace of Knossos

Group B

5. Discuss in detail the development of Hindu temple architecture through Gupta period to Chola period in terms of temple plan and formation of roof. [8+8]
6. Compare and contrast the early Islamic and Mughal tomb architecture of india terms of setting, form, material used and construction technology. [16]
7. Write short notes on: (any four) [4×4]
   a) Indus house form
   b) Vastushatra
   c) Buddhist chaitya hall
   d) Anand temple at pagan
   e) Prakaram and Gopuram

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR502)*

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any Five questions selecting Three from Group A and Two from Group B.*
- *The figures in the margin indicate Full Marks.*
- *Assume suitable data if necessary.*

Group A

1. Discuss in detail the development of Egyptian Temple architecture in terms of its form, material used and construction technology with necessary sketches. [16]
2. With reference to acropolis of Athens, explain in detail Greek sanctuaries and temple architecture. [16]
3. Explain in detail how arch, vault and concrete influenced the Roman architecture in terms of form, space and building process with necessary sketches. [16]
4. Write short notes on: (any four) [4×4]
   a) Stonehenge
   b) Hagia Sophia
   c) Chapel of Notre Dam
   d) Dome of Florence
   e) Greek order

Group B

5. Discuss in detail the development of Hindu rock-cut temple architecture from Ellora, Elephanta and Mahabalipuram in term of form and cutting techniques. [8+8]
6. Compare and contrast the architecture of Akbar with that of shahjahan in terms of form, decor, material used and construction technology. [16]
7. Write short notes on: (any four) [4×4]
   a) Vedic house form
   b) Vastushatra
   c) Buddhist monastries
   d) Stupa of Borobudur
   e) Hoysala temple style

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I *(AR 502)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions selecting **Three** from **Group A** and **Two** from **Group B**.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

Group A

1. Describe Egyptian Tomb architecture in terms of social believes, architectural form, material used and construction technology. [4+4+4+4]
2. Discuss the development of Greek temple from Mineon to classical Greek period in terms of plan, form, material used and construction technology. [4+4+4+4]
3. Explain how the prevailing climate, topography, available materials and construction know-how of the Rome has resulted in Roman architecture. [4+4+4+4]
4. Write short notes on: (any four) [4×4]
   a) Stonehenge
   b) Byzantine dome
   c) Gothic structural development
   d) Impacts of renaissance thinking into architecture
   e) Industrial revolution

Group B

5. Write on analytical observation of the development of Hindu temple architecture from Gupta period to Nayak period in terms of temple plan, formation of roof, materials and technology. [6+4+3+3]
6. Compare and contrast the early Islamic architecture with late Mughal architecture in India in terms of building form, materials used, decoration and construction technology. [4+4+4+4]
7. Write short notes on: (any four) [4×4]
   a) Vastupurashmandala
   b) Indus settlement
   c) Buddhist Chaitya hall
   d) Anand temple at Pagan
   e) Kailash temple at Ellora

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.		Regular / Back	
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - History of Architecture I

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt <u>All</u> questions.*
- *The figures in the margin indicate <u>Full Marks</u>.*
- *Assume suitable data if necessary.*

Group A

1. Write concise but complete definitions for the following architectural terms (with necessary sketches as far as possible). [12]

a) ABACUS
b) Arris
c) Basilica
d) Clerestory window
e) Frieze
f) PERGOLA
g) HYPOSTYLE HALL
h) Pier
i) Rococo
j) Stoa
k) Villa
l) Aqueduct

2. With reference to the temple of Hatshepsut, discuss the Egyptian rock cut experimentation with Mortuary temples. [12]

OR

Describe the development of Roman basilica and its adaption and use on Christian churches. Use necessary sketches to support your answer. [12]

3. Compare and contrast the Roman forum with Greek AGORA in terms of form, economic condition, available materials and technical know how. [3+3+3+3]

4. Write short notes of any two of the following topics: [6+6]

a) Byzantine dome
b) Neo-classical architecture
c) Gothic church
d) Acropolis

Group B

5. Describe the use of Bimana roof through history of Indian architecture from Chalukyan period to Chola period. [12]

6. With examples from Khajurao area, discuss the Khajurao temple architecture in terms of planning, form, carvings and materials used and method of construction. [4+4+4]

OR

With reference to Fatehpur Sikri, discuss the contribution of Akbar to early Mughal architecture in India. [12]

7. Write short notes on any two of the following topics: [4+4]

a) Mahenjodaro
b) Buddhist Chaitya Hall
c) Vastu Shastra
d) Chinese Pagoda

Engineering College
Department of Architecture
2072, Falgun 26

Exam	Test		
Level	B.Arch	Full Marks	60
Program	Architecture	Pass Marks	32
Year/Part	II/I	Time	3 hrs

***Subject*: History of Architecture I**

- *Use necessary sketches to illustrate your answer as far as practicable*
- *Attempt all questions.*

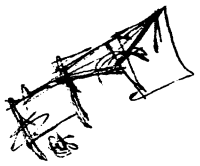
1. Discuss the progressive development of Egyptian pyramid Architecture in terms of socio-cultural beliefs, materials used, construction technology and architectural merit. (15)

2. Write a comparative analysis of the Greek Agora with the Roman Forums with special reference to socio cultural influences, material availability, built forms and technical knowhow. (15)

3. Discuss the origin and development of Hindu Temple Cities in context of plan configuration, roof formation, decorative features and defensive mechanisms. (15)

4 Write short notes on the followings. **(Any TWO)** (7.5x2)

i) Fatehpur Sikri
ii) Gothic Chrrhes
iii) Japanese pagoda
iv) Buddhist chaitya Hall



Tribhuvan University
Institute of Engineering
Exam Section of
2073 Falgun

Engineering College

Exam	Final Assessment		
Level	B. Arch	Full Marks	50
Program	Architecture	Pass Marks	20
Year/Part	II/I	Time	2 hrs.

Subject: History of Architecture I

- ✓ ***Attempt All***
- ✓ ***All questions carry Equal Marks***
- ✓ ***Support your answers with relevant sketches***

1. Write about the various stages of development of Egyptian Pyramid Architecture. Write wit reference to their form development, material and technology, socio-cultural influence.

2. Write an architectural appreciation of the Roman Pantheon with proper reference to material technological innovations and architectural elements used. How is it influenced by Greek temples?

3. Discuss the development of Dravidian Temple Cities through various dynastic periods in context of plan configuration, roof formation, decorative features and defensive mechanisms.

4. Write about the salient features of Mughal Tomb Architecture with mention of proper examples.

5. Write short notes on (ANY 2):
   a. Gothic Churches
   b. Florence Cathedral
   c. Doric Order

Tribhuvan University
Institute of Engineering
Exam Section of [illegible] Engineering College
2073 Mangsir 10

Exam	Alternate Day Test I		
Level	B. Arch	Full Marks	20
Program	Architecture	Pass Marks	08
Year/Part	II/I	Time	45 min

Subject: History of Architecture I

1. Define the following terms **(ANY EIGHT)**:

   Mastaba Pylon Hypostyle Entasis Obelisk Clerestory Fluting
   Sphinx Entablature Frieze (10)

2. With the help of necessary sketches, write about the space flow in a typical Egyptian Temple

   OR

   Make a comparative sketch of the Doric and an Ionic Order. (10)

Tribhuvan University
Institute of Engineering
Exam Section of :
2073 Magh 21

Engineering College

Exam	Alternate Day Test		
Level	B. Arch	Full Marks	20
Program	Architecture	Pass Marks	08
Year/Part	II/I	Time	45 min

Subject: History of Architecture I

1. Write about the evolution and development of Rock Cut Hindu Architecture. (10)

2. Write Short Notes on: (ANY TWO) (10)
   i. Great Bath of Mohenjodaro
   ii. Vimana and Gopuram
   iii. Chaitya Hall

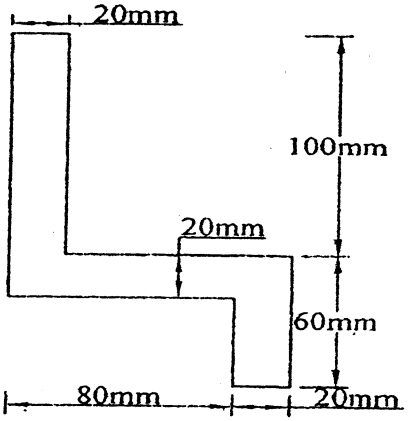
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I (*CE 507*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) What do you mean by stiffness and strength of the structure? How do we consider them in design of structure? [4]
   b) Draw and explain the elasticity curve for mild steel. [4]
2. a) Explain with example how free body diagram is used for the analysis of the structure subjected to various load. [4]
   b) What do you mean by Bending Moment Diagram, Shear force diagram and Axial Force Diagram? Draw SFD and BMD for a simply supported beam of length 5 m which is subjected to a Uniformly distributed load of 10 kN/m throughout the beam. [6]
3. a) In the given figure, determine moment of inertia of the given cross-sectional area about centroidal X and Y axis. [8]



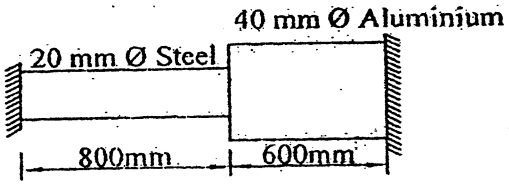
4. Define axial and lateral strain. If an elastic rectangular bar of cross sectional size 50 mm × 100 mm and length 2 m is applied with an axial tensile force of 70 kN, determine the change in its length and the change in the cross-sectional dimensions. The Young's modulus of elasticity E= 200 GPa and Poisson's ratio is 0.32 for the bar. [8]
5. a) A 6 m pole is standing vertically on the ground with its base fixed. It is circular in cross section with 250 mm diameter. A lateral load of 10 kN is acting horizontaly at the top of the pole. Find the deflection of the pole at its top point in the direction of the load. Take $E = 2.1 \times 10^5$ N/mm^2. [6]
   b) Derive the relation between Modulus of Rigidity and Modulus of Elasticity. [4]
6. a) Derive the Torsional Equation for any structure undergoing torsion. [6]
   b) A solid plate 100 mm in diameter transmit 8 kN-m torque. Find the maximum shear stress induced in the shaft. Find also the angle of twist at the end of 3 m. Take shear modulus = 8×10^4 N/mm^2. [8]

7. Find the maximum bending moment and draw flexural stress diagram at that section of a beam of cross section 30 mm wide and 60 mm deep if the beam of length 5 m carrying two point loads of magnitude 12 kN each at $1/3^{rd}$ of span from each side. [6]

8. What do you mean by Buckling load? Derive Euler's formula for bucking load for a column section whose both ends are fixed. [2+6]

9. A composite bar made up of aluminum and steel is rigidly fixed between two supports as shown in figure below. The two bars are free of stresses at 40°C. Find the stresses in two bars when the temperature falls to 25°C if supports are unyielding.

   Take $E_{steel} = 2.10\times10^5$ N/mm^2 $E_{Al} = 0.7 \times 10^5$ N/mm^2, coefficient of thermal expansion for aluminum and steel are 2.34×10^{-6}/°C and 11.7×10^{-6}/°C respectively. (Figure attached) [8]



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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

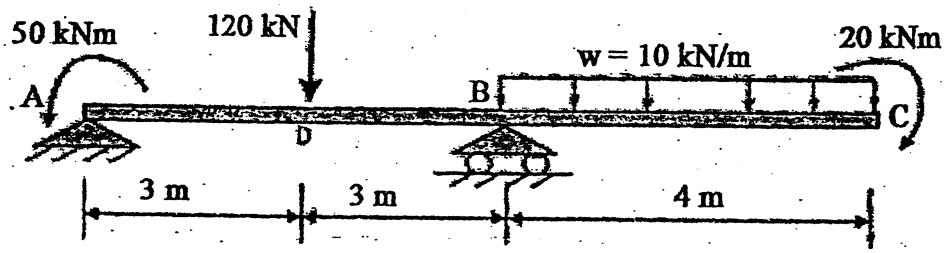
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I *(CE 507)*

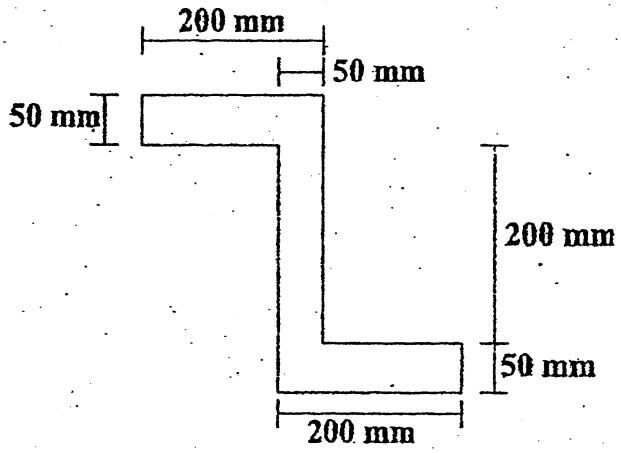
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Describe different types of structural supports with their support reactions and degree of freedom. [6]

   b) Draw SFD and BMD for the beam. [10]



2. a) Determine Moment of Inertia of the following figure with respect to centroidal XX and YY axes. [10]



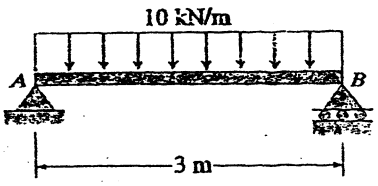
   b) Draw stress-strain curve for mild steel and explain the significant points. [6]

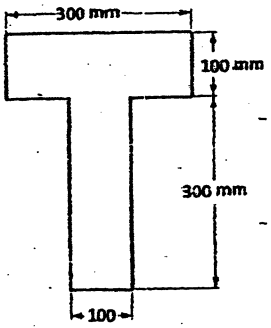
3. a) Define axial, shear, torsional and flexural stresses. [4]

   b) Define lateral strain and Poisson's ratio. A metallic bar 300 mm × 40 mm is subjected to force of 5 kN(tensile), 6kN(tensile) and 4kN(compressive) in x, y and z direction respectively. Calculate the volume change of the bar. Take E = 2×10^5 N/mm^2 and Poisson's ratio = 0.25. [2+10]

4. a) Calculate the elongation of a uniformly tapering circular bar of length l with diameter varying from D to d. [6]

b) Calculate the maximum compressive and tensile stress for the T-section beam given in the figure, which is used for a simply supported beam of span 3m with UDL of 10 kN/m. [10]





5. a) Calculate the slope and deflection at the free end of a cantilever beam of length, l loaded with UDL of intensity, q over the whole span. [8]

b) Derive the expression for buckling load for column with one end fixed and other end free. [8]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

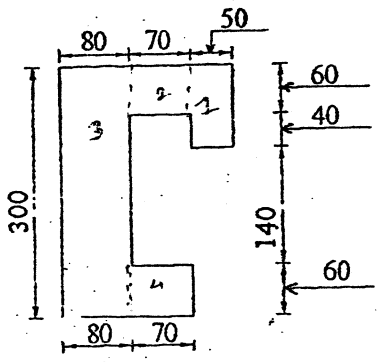
Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I *(CE 507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

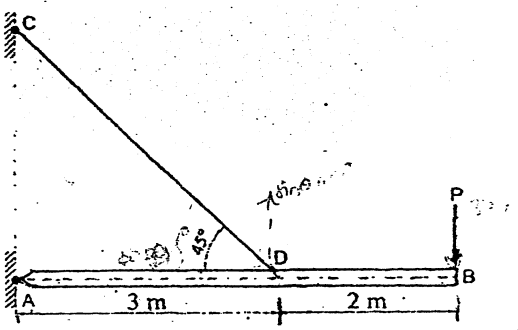
1. a) Sketch any three types of structural support condition with their support reactions. [4]
   b) Define rigid body and deformable body. What is free body diagram, explain with examples. [4]
   c) Define four cases of stress and strains with necessary sketches. [4]
   d) Write equations of equilibrium. Also, describe method of section to analyse the internal effect of forces on a body. [1+3]

2. a) Determine the moment of inertia of the section shown in figure below about its centroidal axes. Also, determine its polar moment of inertia. (All dimensions are in mm) [8]



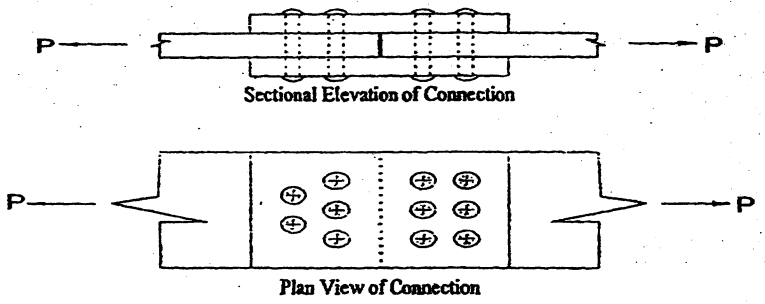
   b) Derive Euler's formula of critical load for a column with both ends pinned. Also, write the Euler's formula for columns with other end conditions. [5+3]

3. a) A rigid beam AB is hinged at end A and supported by a steel wire CD at D as shown in figure below. Given that P = 30KN, area of cross section for wire A_{CD} = 4cm^2. Determine the stress in the wire CD. Also, calculate vertical and horizontal displacement of point B with direction. (Take $E_{steel} = 2\times10^5$ Mpa). [10]



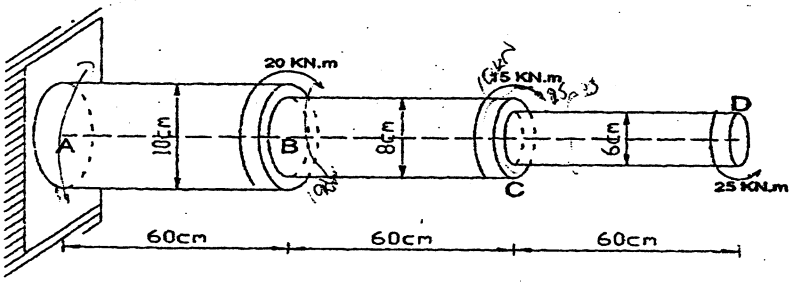
   b) Describe Hooke's law. Define section modulus, radius of gyration and parallel axis theorem. [6]

4. a) Two steel plates are connected by rivets as shown in figure below. Calculate shearing stress in each rivets if the plates are pulled by a force of P = 50 KN. Take diameter of each rivet as 40 mm. [4]

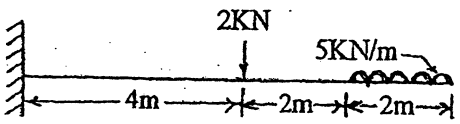


b) A hollow circular bar having outside diameter twice the inside diameter is used as a beam. From the bending moment diagram of the beam, it is found that the bar is subjected to a bending moment of 40 kNm. If the allowable bending stress in the beam is to be limited to 100MN/m^2. Find the inside diameter of the bar. [6]

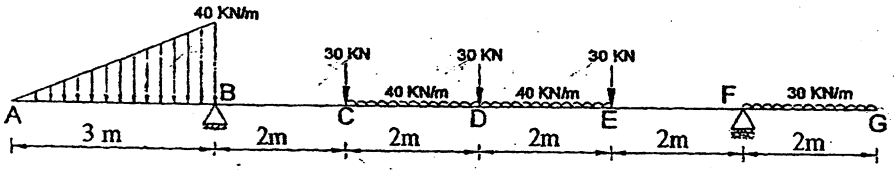
c) Calculate the total angle of twist in the stepped solid circular shaft at free end. Take G = 9×10^4 Mpa. [2+2+2]



5. a) Find the slope and deflection at the free end of the cantilever beam shown in figure below. Take EI = 1 × 10^2 KN-mm^2. [6]



b) Draw SF and BM diagrams for following beam. Indicate salient points. [10]



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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

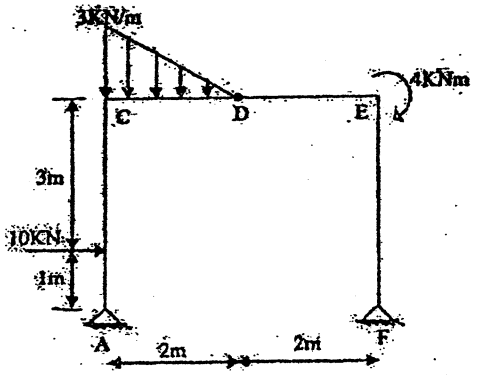
Subject: - Structure I *(CE 507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

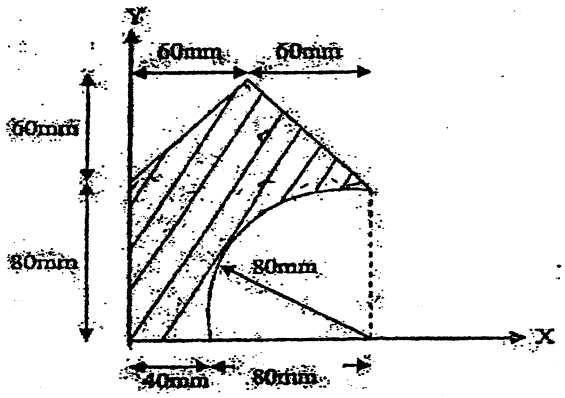
1. a) What are the differences between stable and unstable structure, explain with examples. [4]

   b) Define the stiffness and strength of the structure, what is its importance in the design of the structure. [4]

2. Draw the AFD, SFD and BMD of the following frame and find out the salient features if any. [10]



3. Find out the Planar Moment of Inertia about the centroidal axes of the given composite figure. Also find out the polar moment of inertia. [6+2]

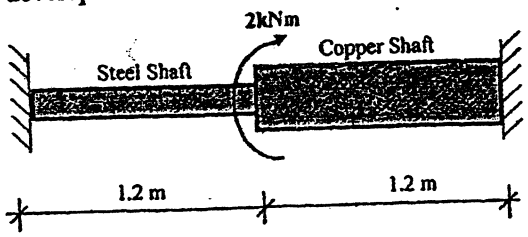


4. Define Poisson's Ratio, if an elastic rectangular bar of cross sectional size 50mm×100mm and length 1.5m is applied with an axial tensile force of 80kN, determine the change in its length and the change in the cross-sectional dimensions. The Young's modulus of elasticity E=200Gpa and Poission's ratio is 0.32 for the bar. [8]

5. a) A 4.5m pole is standing vertically on the ground with its base fixed. It is circular in cross section with 250mm diameter. A lateral load of10kN is acting horizontally at the top of the pole. Find the deflection of the pole at its top point in the direction of the load. Take $E = 2.1\times10^5$ N/mm^2. [6]

   b) Define shear stress, shear strain and modulus of rigidity with neat sketches. Derive the relationship between modulus of rigidity and modulus of elasticity. [4]

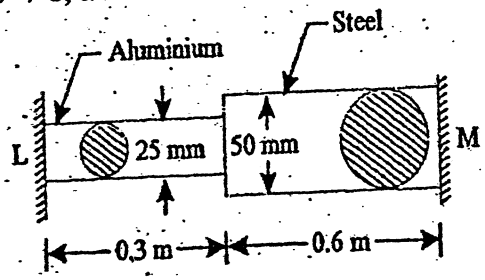
6. A circular steel shaft of diameter 60mm and a copper shaft of diameter 75mm is connected as shown below. If 2kNm torque is applied at the junction determine the maximum shear stress developed in steel and copper shaft. Assume that $G_{steel}=2\times G_{copper}$. [8]



7. Define section modulus. A timber beam of span 4.5m is carrying a uniformly distributed load of 40KN/m. Find suitable depth of beam if the width is 120mm when the safe allowable bending stress is 8N/mm^2. [2+6]

8. A composite bar made up of aluminum and steel is rigidly fixed between two supports as shown in figure below. The two bars are free of stresses at 40°C. What will be the stresses in the two bars when the temperature falls to 20°C if :
   a) The supports are unyielding and
   b) The supports come nearer to each other by 0.15mm. [8]

   It is assumed that the change in temperature is uniform throughout the length of the bar.
   Take E steel = 2.1×10^5 N/mm^2, E alm = 0.7×10^5 N/mm^2,
   Take α steel = 11.7×10^{-6} /°C, α almn=23.4×10^{-6} /°C



9. Derive with Euler's equation that the critical load for a steel column with both ends fixed is equal to $\frac{4\pi^2 EI}{l^2}$ where all parameters have their usual meanings. [8]

10. Define free body diagram and describe its importance. [4]

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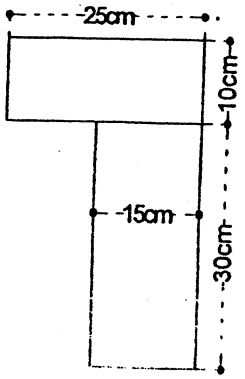
16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

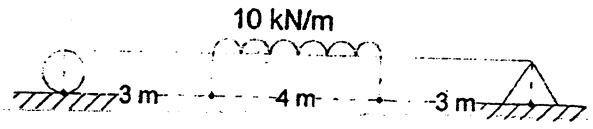
Subject: - Structure I *(CE507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Define building structure and explain different types of building structure found in Nepal. [6]
   b) List two major differences between deformable bodies and rigid bodies. [2]
2. a) What do you mean by free body diagram and why it is necessary? Explain. [2+2]
   b) Define modulus of elasticity and modulus of rigidity. [6]
3. Determine centroid and moment of inertia of the given cross-section. Also calculate section modulus about horizontal axis. [4+6+2]



4. a) Define axial strain, lateral strain and poison's ratio. [2+2+2]
   b) A mild steel bar of size 200 mm wide x 100 mm thick and one meter long is subjected to an axial compression of 200 kN. Find the dimensions and volume after deformation. Take $E = 2.5 \times 10^5$ N/mm^2. [6]
5. Explain Hooke's law, shear stress and shear strain. [5]
6. Find the maximum bending moment and draw flexural stress diagram at that section of a beam of cross section 25 mm wide by 50 mm deep if the beam of length 6 m carrying two point loads of magnitude 10 kN each at 1/3rd of span from each side. [5]
7. A solid shaft of diameter 150 mm transmits 10 kN-m torques. Draw the shear stress diagram induced in the shaft. Find also the angle of twist at the end of 3 m. Take shear modulus = 8×10^4 N/mm^2. [4+4]
8. Calculate and draw bending moment diagram (BMD) and shear force diagram (SFD) of the beam loaded as shown below. [6+6]



9. What do you mean by buckling load? Derive Euler's formula for bucking load of a column section for pin-ended support conditions. [2+6]

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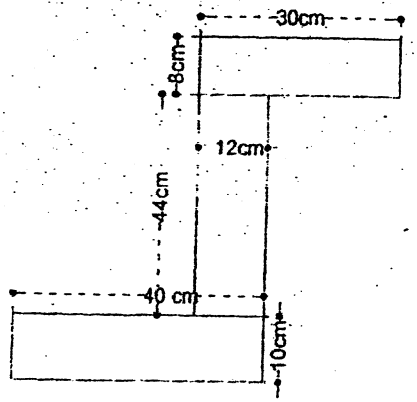
16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

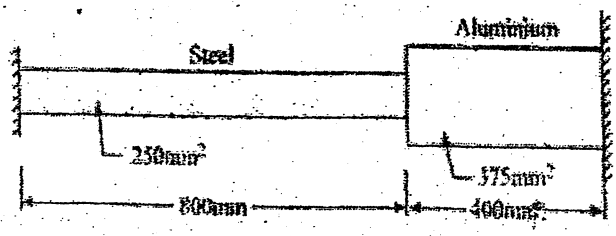
Subject: - Structure I *(CE507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain mechanical properties of materials used to make a civil structures. [4]
   b) Define rigid body and deformable body used in buildings. [4]
2. a) Define Poisson's ratio, modulus of elasticity, bulk modulus and modulus of rigidity. [4]
   b) Explain principle of equilibrium and its application on mechanics. [4]
3. Determine moment of inertia of the given cross-section about centroidal x and y axes. [8]

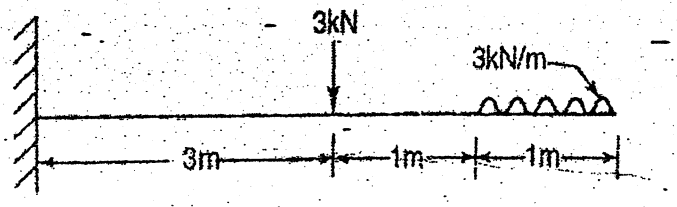


4. The composite bar consisting of steel and aluminum components shown in figure below is connected to two grips at the ends at temperature of 60°C. Find the stresses in the two rods when the temperature falls to 20°C, if the end of the support are non-yielding. Take $E_S = 2.1\times10^5 N/mm^2$, $E_A = 0.70\times10^5 N/mm^2$, $\alpha_S = 1.17\times17\times10^{-5}/°C$, $\alpha_A = 2.17\times10^{-5}/°C$. Area of the steel and aluminum bars are 250 mm^2 and 375 m^2. [8]



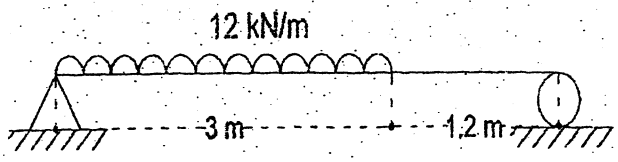
5. Two steel plates are connected by a rivet of diameter 20 mm. Calculate average shear stress in the rivet if the plates transmit a pull of 16 kN and rivet is in double shear. [8]

6. Find the slope and deflection at the free end of the cantilever beam shown in figure below. Take $EI = 1\times10^2 KN-mm^2$ [8]



7. A solid shaft 120 mm in diameter transmits 6 kN-m torque. Find the maximum shear stress induced in the shaft. Find also the angle of twist at the end of 3 m. Take shear modulus = $8\times10^4 N/mm^2$. [4+4]

8. Calculate and draw shear force diagram (SFD) and bending moment diagram (BMD) of the simply supported beam loaded as shown in figure below. [4+4]



9. Define modulus of section. A timber beam of span 4 m is carrying a uniformly distributed load of 40 KN/m. Find suitable depth of beam if the width is 120 mm, the safe allowable bending stress is 8 N/mm^2. [1+7]

10. Derive Euler's formula for crippling load of column when both ends of the column are fixed. [8]

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14 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

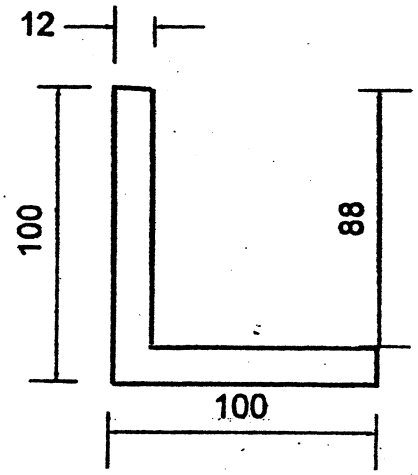
Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I *(CE507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. **What do you understand by elasticity?** Also draw and explain stress-strain curve for mild steel. [2+6]
2. **Define normal stress and strain and shear stress and strain** [8]
3. L section is shown in the figure. [12]

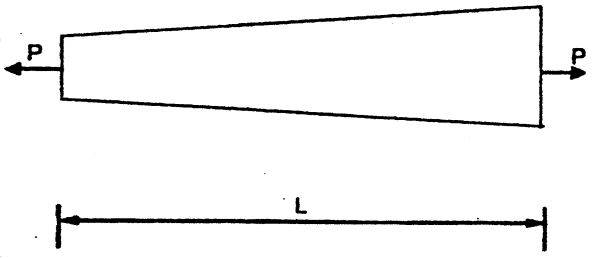
   Calculate moment of inertia about the XX axis and YY axis through the centroid.



Dimensions are in mm

4. Prove the *elongation of a tapered bar of length L that is subjected to an axial pull of P* [12]

$$\Delta L = \frac{4PL}{\pi E d_1 d_2}$$



d_1 = diameter of the bar at left end

d_2 = diameter of the bar at right end

Tribhuvan University
Institute of Engineering
Kathmandu Engineering College
Department of Architecture
2070 Falgun 19

Exam	Final Assessment		
Level	B. Arch	Full Marks	40
Program	Architecture	Pass Marks	16
Year/Part	II/I	Time	2 Hrs.

Subject: Structure - I

- **Attempt all question**

1. A force of *10 kN* is acting on a circular rod with diameter *10 mm*. Calculate the stresses in the rod. [8]

2. Draw stress strain diagram of steel and describe [8]

3. A cube of 10 cm sides is subjected to stresses $\sigma_x = 10$ MPa, $\sigma_y = 8$ MPa, $\sigma_y = 5$ MPa,

If modulus of elasticity = 2×10^5 MPa and Poisson's ratio = 0.28. Calculate final size and change in volume [12]

4. Derive the Relation between E (young's Modulus) and G (Modulus of Rigidity) [12]

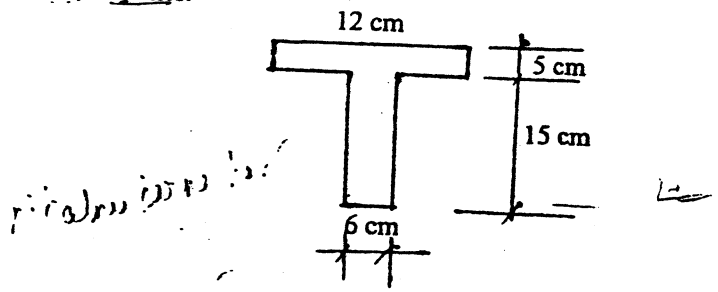
15 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I *(CE507)*

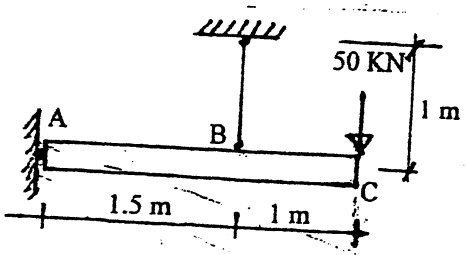
- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Define rigid bodies and deformable bodies. [4]
   b) Explain fixed support reactions and roller support reactions with necessary sketches. [4]
2. a) Describe free body diagram. [4]
   b) Write and explain the equation of static equilibrium. [4]
3. a) Define polar moment if inertia. [4]
   b) Describe ultimate strength and working stress. [4]
4. Calculate moment of inertia of the "T" section as shown in figure below about its centroidal x and y axes. [8]

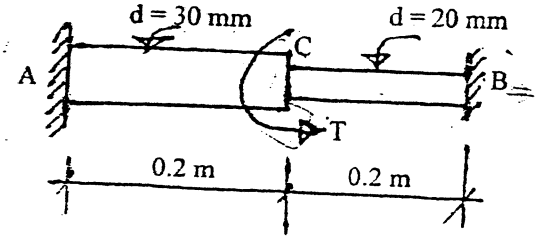


5. A rigid bar ABC loaded as shown in figure below is pin supported at A and also supported by a steel wire of 2 cm diameter at B. Calculate deflection at C. [8]

$E_s = 2\times10^5$ N/mm^2



6. For a simply supported beam of section 25 cm depth and 15 cm (breadth) determine the maximum bending moment which may be applied without exceeding the allowable bending stress of 105 MPa. [8]
7. A steel shaft is connected to fixed supports as shown in figure below. Limiting shear stress in the material is 50 MPa. Determine the maximum torque that can be applied at the joint C. What is then the shear stress at the support A. [8]



i) It provides an identity of the particular object. It contributes to be felt clear and distinguished tangibly, consisting of three basic elements called as primary, secondary and tertiary elements. _____

j) Carefully designed, constructed and sited building can use the power of the sun with mechanical or electrical devices to collect, store, distribute and control the sun's energy. In this system the designer is actually capturing the power of the sun through _____

k) The principle, procedure, or advice that contributes in the search for a satisfactory solution by following a process of elimination until the desired solution is reached. _____

l) Christopher Alexander and Bruce Archer with the help of higher mathematics and computer pioneered and reinvented this design processes. _____

m) During this phase of design process, the schematic design is refined into the final design; it becomes important to give individual attention to each aspect, each space and each detail of the project. _____

XI. Active Solar Design

XII. Programme Formulation

XIII. Leon Battista Alberti

XIV. Christian Norberg Schulz

XV. Charles Edouard Jeanneret

XVI. Vastu Sastra

XVII. Mies van der Rohe

3. Explain Building Task by elaborating on its four main aspects, viz. Physical Control, Functional Frame, Social Milieu and Cultural Symbolization. [10]

4. Give detail description of one of the work of Architecture from bellow and discuss its meaning. [10]

a) Syambhu Stupa
b) Krishna Mandir, Patan
c) Sahid Gate
d) City Center, Kamal Pokhari, Kathmandu

5. Explain the complete general design process with the example of your design studio project. [9]

6. What is Heuristic Reasoning and in what situation of design process is Heuristic more helpful? [9]

7. Write short notes on: [20]

a) Hypothesis
b) Bauhaus school
c) Social Milieu
d) Prognatic and cononic design
e) Miles van der Rohe

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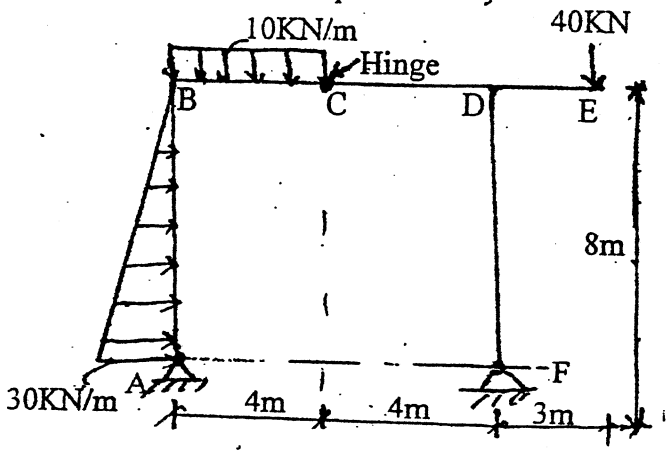
TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Structure I *(CE 507)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **ALL** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Draw axial force, shearing force and bending moment diagram for the given frame loaded as shown in figure below. Indicate salient points if any. [16]

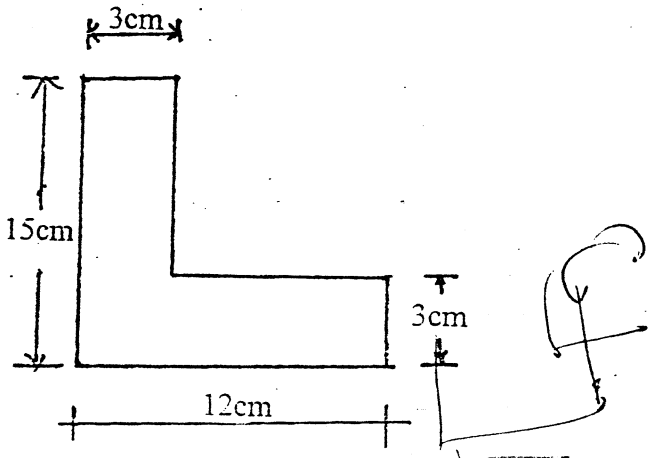


2. (a) Define a structure. Discuss with neat sketches the types of structural supports and their reactions. [4+2]

   (b) Draw a neat sketch of stress-strain curve of mild steel and define the significant points and the processes in the curve. [8]

3. (a) Locate the centroid of the area bounded by two curves $y = x^2$ and $y^2 = 3x$ for all +ve value of x & Y. [8]

   (b) Determine moment of inertia about horizontal and vertical axes passing through the centroid of the plane area shown in figure below. [6]



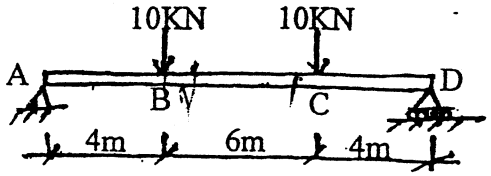
c) A bar 2cm × 4cm in cross section and 40cm long is subjected to an axial tensile load of 70KN. It is found that the length increases by 0.176mm and the lateral dimenson of 4cm decreases by 0.0044mm. Find (i) Young's modulus (ii) Poissions ratio (iii) Change in volume of bar (iv) Bulk modulus. [2×4]

4. a) Define Hook's law, Young's modulus, ultimate strength and working stress. [4]

b) A rectangular beam having depth 400mm and width 250mm is loaded as shown in figure below. Determine: [8]

(i) The maximum stress in portion BC of the beam.

(ii) Stress at distance 3m from the left end A and at 50mm below the top level.



5. a) Two shafts A and B are made of same material. Each shaft transmits the same power. Shaft A running at 200 rev/min while the shaft B running at 20000 rev/min. Find the ratio of diameters of the two shafts if same maximum shear stress is developed in each shaft. [8]

b) Derive with Euler's equation that critical load for a steel column with both ends fixed is equal to $\frac{4\pi^2 EI}{\ell^2}$ where all parameters have their usual meanings. [8]

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15 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	II / I	Time	1½ hrs.

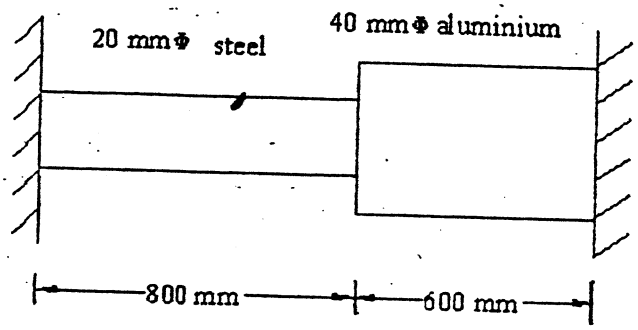
Subject: - Structure I

- Candidates are required to give their answers in their own words as far as practicable.
- *Attempt any **Four** questions.*
- *The figures in the margin indicate **Full Marks**.*
- *Assume suitable data if necessary.*

1. A composite bar made up of aluminium and steel is rigidly fixed between two supports as shown in figure below. The two bars are free of stresses at 40°C. Find the stresses in two bars, when the temperature falls to 25°C if: [10]

   a) The supports are unyielding and
   b) The supports come nearer by 0.1mm

   Take $E_{steel} = 2.1 \times 10^5$ N/mm^2, $E_{Al} = 0.7 \times 10^5$ N/mm^2, coefficient of thermal expansion for aluminium and steel are 2.34×10^{-6}/°C and 11.7×10^{-6}/°C respectively.



2. a) Determine the slope at supports and maximum displacement in the case of simply supported beam of span 'L' carrying uniformly distributed load of intensity 'w' per unit length over the whole span. [6]

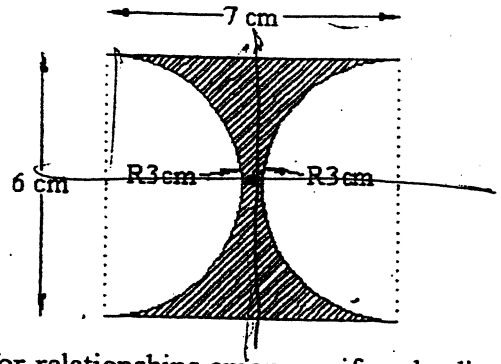
   b) State and explain parallel axis theorem for moment of inertia of a section. [4]

3. Design a rectangular beam section of 3m clear span to carry UDL of 15 kN/m and one point load of 50 kN at the mid section of the beam. [10]

   Given data:

   Permissible compressive and tensile bending stresses are 1.68 kN/cm^2 and 1.40 kN/cm^2
   Maximum horizontal shear stress is 0.9 N/mm^2
   Permissible deflection is (L/360)m, where L = span length
   Take E = 1.27 kN/cm^2

4. a) Find radius of gyration of section about X-X axis shown in figure below.



b) Derive an expression for relationships among uniformly distributed load, shear force and bending moment. [3]

5. a) A solid round bar 3m long and 5cm in diameter is used as a strut with both ends of the column hinged. Determine collapsing load and safe load. Take $E = 2 \times 10^5$ N/mm^2 and factor of safety = 2.5. [6]

b) Write short notes on: [4]

i) Strength, stiffness and stability
ii) Volumetric strain and bulk modulus

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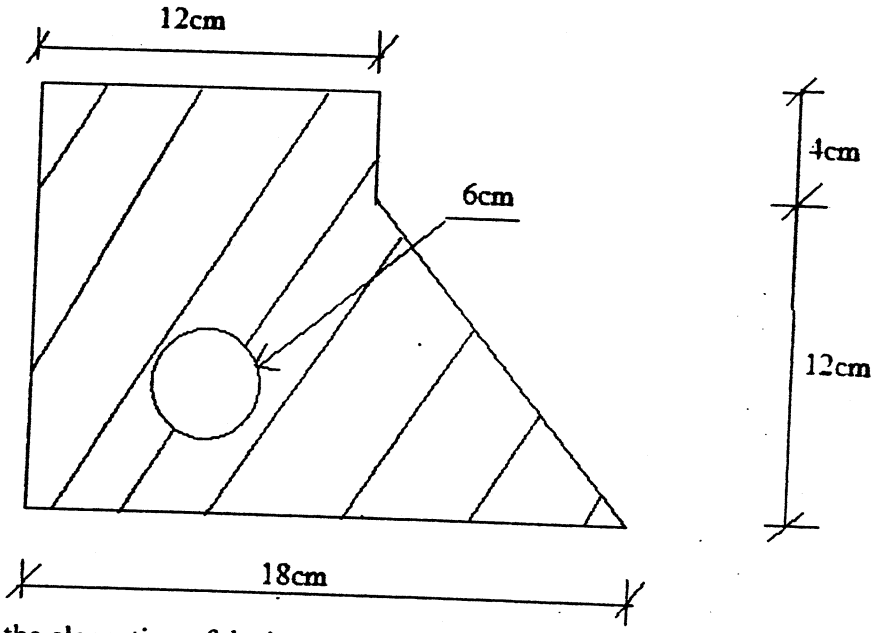
Engineering College

Falgun 30, 2073

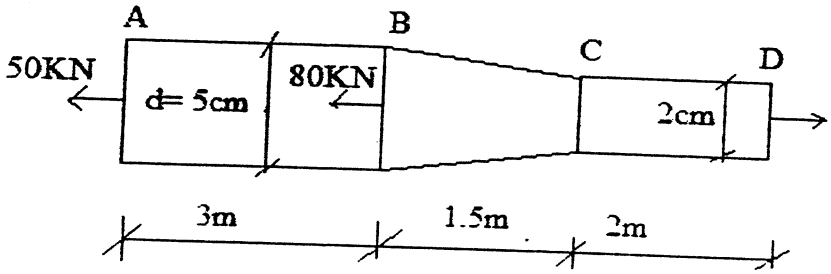
Exam	Final Assessment		
Level	Arch	Full Marks	60
Program	Arch	Pass Marks	24
Year /Part	II/I	Time	2 hrs

Subject: Structure

1. Derive the Euler's crippling load for both end hinged column. (8)
2. Calculate the moment of inertia about the Centroidal axis of given composite section. (10)

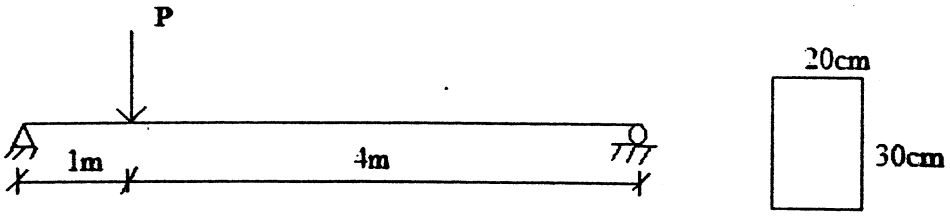


3. Determine the elongation of the bar as shown in figure. Take E= 200GPa. (8)

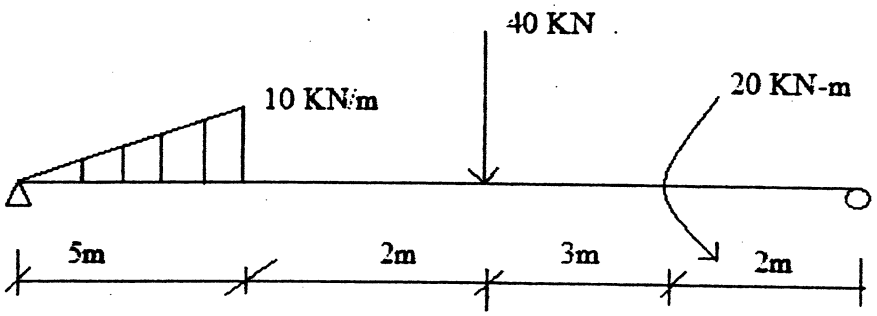


4. Define stiffness, strength and stability. What is free body diagram, explain with example. (6)
5. Sketch and explain the Stress- strain relation in mild-steel. (6)

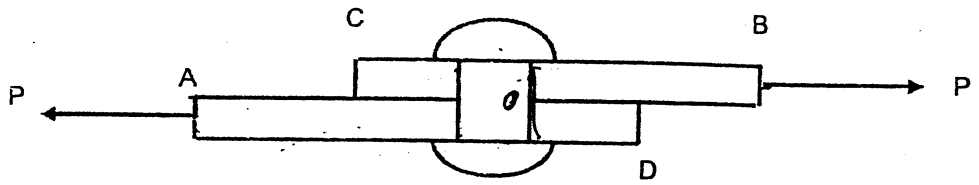
6. Determine the maximum value of P if the permissible bending stress is 20N/mm^2 in the simply supported beam as shown in figure below. (8)



7. Draw bending moment and shear force diagram for following beam. (14)

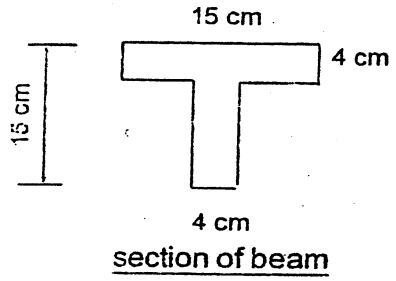


4. Two steel plates are joined by a rivet of 20 mm diameter. Calculate shearing stress in the bolt if the plates are pulled by a force of 8 kN.

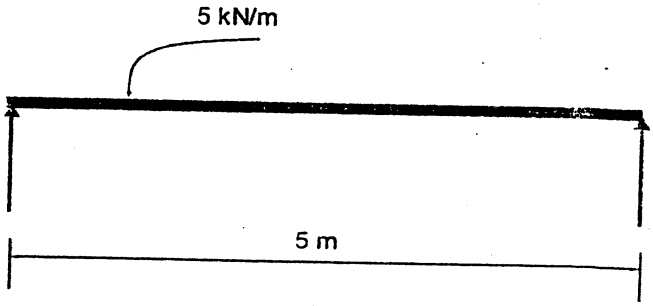


shear force, P

5. A simply supported beam 5 m span and T section as shown in figure carries uniformly distributed load of 5 kN per meter on the whole span. Calculate maximum bending stress in tension and in compression.



section of beam

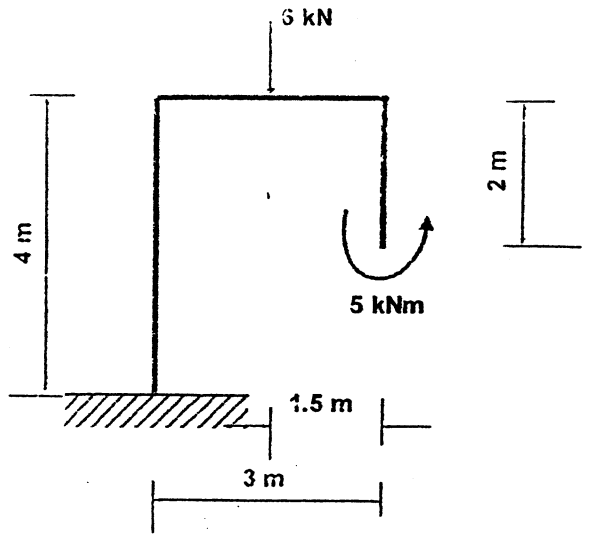


6. A hollow circular bar having outer diameter twice the inner diameter is used as a beam. If the allowable bending stress in the beam is to be limited to 100 MPa, determine the section of the beam to carry a BM of 40 kNm

7. A shaft is made from tube 25 mm outer diameter and 20 mm inner diameter. The shear stress must not exceed 150 MPa. Calculate the maximum torque that can be placed on it.

8. A shaft must transmit 20 kW of power at 300 rev/min. The shear stress must not exceed 150 MPa. Calculate a suitable diameter.

9. Draw (a) axial force diagram (b) shear force diagram and (c) bending moment diagram of the structure shown in figure.



10. A cantilever beam of span 3 m is carrying a point load of 10 kN at its free end. The section of the beam is 100 mm [breadth] and 150 mm [depth] and Modulus of elasticity of the material of the beam is 2000 N / mm^2.Calculate slope and deflection at free end of the beam.

11.A round bar 1.5 m long deflects 10 mm under a load of 300 N at its free end when used as a cantilever beam. Calculate Euler's crippling load for the bar when used as a strut with both ends pinned.

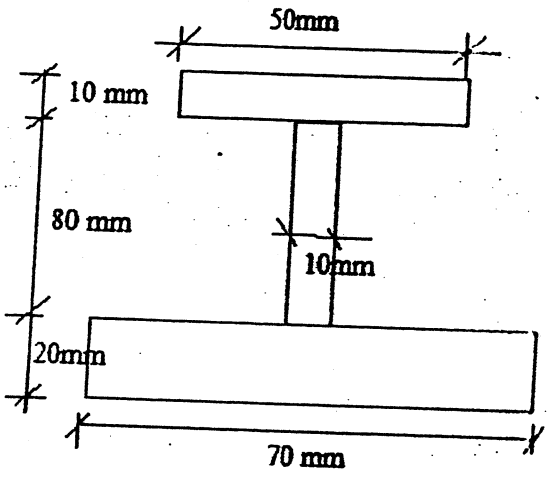
12. Determine the size of a 2 m long pin ended column of square cross section if the column is to safely support 200kN. Assume E=12.5GPa, σ_{allow} = 12MPa for compression and use a factor of safety of 2.5. Use Euler's critical load for bucklin

Tribhuvan University
Institute of Engineering
Exam Section of : Engineering College
2073 Mangsir 22

Exam	Alternate Day Test I		
Level	B. Arch	Full Marks	20
Program	Architecture	Pass Marks	08
Year/Part	II/I	Time	45 min

Subject: Structure I

1. Define rigid body and deformable body. (4)
2. Define Polar moment of Inertia and radius of gyration. (4)
3. Find MoI about Centroidal axis of the section below. (12)



Tribhuvan University
Institute of Engineering
Exam Section of ' Engineering College
2073 Falgun 4

Exam	Alternate Day Test 2		
Level	B. Arch	Full Marks	20
Program	Architecture	Pass Marks	08
Year/Part	II/I	Time	45 min

Subject: Structure I

1. Derive crippling load for column with one end fixed and other hinged. (10)

2. A rod of 25mm diameter and 2m in length under goes elongation of 2mm when loaded with 30KN force and same bar is twisted by 1 degree when twisting moment of 300N is applied. Determine poison's ratio. (6)

3. Define FBD and flexural stiffness. (4)

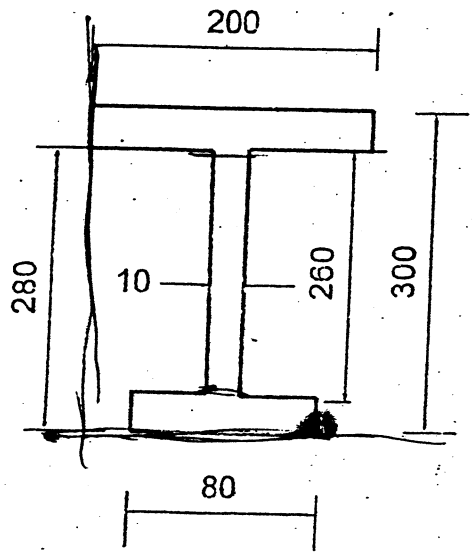
B Arch 2nd Year

Structure I

Assignment

Submit to Prof. T. R. Thapa 2070/11/27

1. A T section is shown in the figure.
Calculate moment of inertia about the XX axis and YY axis through the centroid.



Dimension are in mm

Change in length = $\frac{PL}{AE}$

2. A compound tube consists of steel tube 140 mm internal diameter and 8 mm thickness and outer brass tube 160 mm internal diameter and 10 mm thickness. The two tubes are of same length .The combined tube carries an axial load of 1000 kN. Find the stresses and load carried by each tube and the amount it shortens. Length of each tube is 140 mm. $E_{steel} = 2 \times 10^5$ MPa $E_{steel} = 1 \times 10^5$ MPa.

3) A copper tube 300 mm long and having a cross sectional area of 2000 mm^2 is placed between two very rigid caps made of invar. Four 22 mm diameter steel bolts are symmetrically arranged parallel to the axis of the tub and are lightly tightened. Find the stress in the tube if the temperature of the assembly is raised from 15^0 C to 70^0C. Let $E_{cu} = 120$ GPa . $E_s = 200$GPa. $\alpha_{cu} = 0.000016$ per ^{0}C and $\alpha_s = 0.000012^0$ C

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Pg 285

12/31/2015

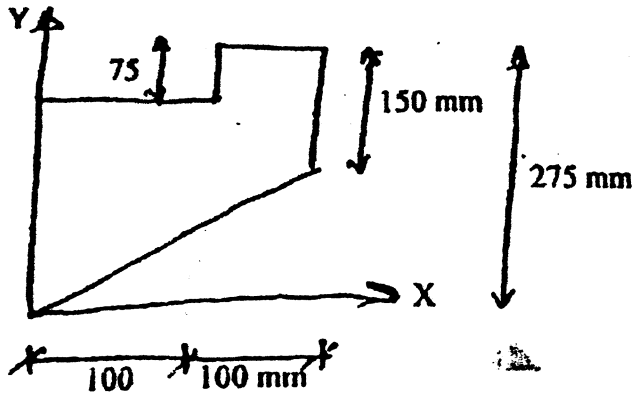
Tribhuvan University
Institute of Engineering
Engineering College
2072 Poush

Exam.	**Final Assessment**		
Level	BE	**Full Marks**	20
Programme	B.Arch.	**Pass Marks**	8
Year / Part	II/I	**Time**	40min

Subject: - Structure I

- ✓ Attempt all question
- ✓ The figures in the margin indicates **Full Marks**
- ✓ Assume suitable data if necessary

1. Calculate the moment of inertia and radius of gyration of the composite area about X and Y axis. [10]



2. Define normal stress and strain and shear stress and strain. [5]
3. Define Polar moment of inertia. [5]

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Material II (*AR 503*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) How are trees classified? What are the forces responsible for causing natural defects in timber? Explain such natural defects of timber. [3+2+4]

   b) Describe the conversion of timber and its types. Differentiate between the hard wood and soft wood. [4+3]

2. a) What are the differences between (i) ferrous and nonferrous metals (ii) Cast iron and wrought iron? [5+3]

   b) Describe the chief characteristics and use of, Aluminum. What is an alloy? Illustrate in brief on copper alloy. [3+2+3]

3. a) What are paint and its ingredients of paint? What are the characteristic of good paint. [4+4]

   b) Describe in brief the process of painting on wooden surface. Differentiate between the distemper and varnish. [5+3]

4. a) What is wall finishing and floor finishing? Write in brief on its finishing materials. [4+4]

   b) Define Ferro cement. Illustrate in detail of the types of plaster. [3+5]

5. Write short notes on: (Any Four) [4×4]

   a) Industrial timber
   b) ACP
   c) False ceiling
   c) Glass
   d) Gypsum

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Materials II *(AR 503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Describe the various types of sawing for conversion of timber with neat sketches. [8]
   b) What do you mean by endogenous and exogenous tree? Describe the structure and growth of exogenous tree. [4+4]
2. a) Define Metal. Describe the chief characteristic of Aluminum and Alloys of Copper. [2+6]
   b) Illustrate the main characteristics and uses of cast iron and wrought iron. [4+4]
3. a) What are the characteristics of an Ideal Paint? Explain the constituent of paints in brief. [4+4]
   b) What are the characteristics of varnish? Explain the process of varnishing on wood work. [4+4]
4. a) What so you mean by fire resistant construction? Write briefly about steel as fire resisting material. [4+4]
   b) What are the various types of floor finishing which can be used in interior of a building? [8]
5. Write short notes on: (Any Four) [4×4]
   a) Lime Plaster
   b) Plaster
   c) Plaster of Pairs
   d) ACP
   e) Ferro-cement

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAE	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Material II *(AR 503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) What are the advantages of timber seasoning? [6]
   b) Explain any three defects in timber with neat sketches. Suggest methods of preserving timber. [3+6]
2. a) Explain various market forms of steel with neat sketches. [5]
   b) Write the properties and uses of Tin and Lead. [5+5]
3. a) Define Paint. Explain the method of painting in old wood & iron surface. [2+5]
   b) Write down the various types of Paint. [8]
4. a) What is insulation. Explain thermal insulator. [6]
   b) Write down about Asbestos and glass. [4+3]
   c) Define plaster & give a short brief of various ingredients of lime & cement plaster. [2+5]

   Or,

   a) Explain about insulation materials in building. [4]
   b) Explain about five hazards in building & write down about the fire protective materials with an appropriate techniques. [8]
   c) Define rendering. Explain about cement plastering method on stone surface. [8]
5. a) Define floor finish and wall finish. Discuss about Gypsum Plaster. [2+5]
   b) Explain about the use of marble, granite, and brick as wall cladding material. [5]
   c) Explain about current AC panel practice as external wall cladding support your answer with sketch. [3]

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Material II *(AR503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Write about classification of trees? Illustrate the structure and growth of exogenous tree with neat sketches. [2+6]
   b) What are defects in timber? Explain defect due to conversion and seasoning. [4+4]
2. a) What are the differences between ferrous and non ferrous metals? [6]
   b) Describe the chief characteristics and its use of Cast iron, Aluminum. [5+5]

OR

   a) Define metal and its use in architectural field. Sketch out the various types of market forms of metal. [3+6]
   b) What is an alloy? Illustrate in brief on copper alloy. [2+5]
3. a) Define paint and what are its functions? List out the various types of paint, explain any two. [2+2+4]
   b) What are the chief ingredients of paint? Describe in brief the process of painting on a plastered surface. [4+4]
4. What is floor finishing? Write in brief on its final floor finishes as In-situ floor, applied floor and timber floor finishes. [1+5+5+5]
5. Write short notes on: (any four) [4×4]
   a) Glass
   b) Ferro cement
   c) Terrazzo
   d) Mud plaster
   e) ACP

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16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Material II *(AR503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) What is timber? How trees can be classified? [8]
   b) Enumerate the characteristics of good timber. [8]
2. a) Explain various standard section of M.S used for construction purposes with neat sketches. [8]
   b) Explain the properties and uses of Cast Iron. [8]
3. a) What is the function of the paint? Enumerate any three types of paint. [8]
   b) Mention the objects of painting. Give a brief description of the process of painting on metal surface. [8]
4. a) Explain in brief about fire resisting properties of few common construction materials. [8]
   b) Define sound isolation. Write in brief about any two sound insulating materials. [8]
5. Write short notes on: [4×4]
   i) Wall putty
   ii) Ply wood
   iii) Lime plaster
   iv) Asbestos

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Materials II *(AR503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. Define metal. Describe the chief characteristics and uses of cast iron and wrought iron. [3+6+6]

OR

Name and sketch various forms of steel sections available in market. [15]

2. What is timber? How trees can be classified? Enumerate the characteristic of good timber. [3+6+6]

OR

Draw a cross section of an exogenous tree and show its various parts. Give brief description of each shown part. [10+5]

3. What are the functions of the paint? Point out the characteristic of an ideal paint. What is meant by covering power? [6+6+3]

4. What are insulators? Name different materials used as insulators for heat and sound. Write down asbestos as fire proof material. Explain briefly the different types of plaster as external and internal wall finish. [2+6+4+8]

OR

Define Rendering. Explain use of laths in wall and ceiling plasters. Discuss Asbestos and fire proof materials and Thermocole as sound insulator. [4+8+8]

5. Define wall finish. Explain cement punning and mosaic finish as wall finish and ACP as external wall finish of current market trend. [4+8+3]

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	II / I	Pass Marks	32
Year / Part	B. Arch.	Time	3 hrs.

Subject: - Building Materials II *(AR 503)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Draw a neat sketch of cross-section of matured tree and name its different parts and describe it in brief. [8]
   b) What is meant by seasoning of timber? What are its objects? [4+4]
2. a) Describe the chief characteristics and use of cast iron and wrought iron. [4+4]
   b) What is an alloy? Write down the uses of copper, lead, aluminum and brass. [2+6]
3. a) What is paint? Enumerate various types of paint. [2+6]
   b) Illustrate the process of painting on different surfaces (wood and plaster) [4+4]
4. What is finishing material? Describe various types of floor finishing materials and their uses. [4+12]
5. Write short notes on: (any four) [4×4]
   a) Thermal insulator materials
   b) Plywood
   c) Glass
   d) Plaster of paris
   e) Distemper

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11 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Materials II

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Seven questions selecting Six from Question No. 1 to 7.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Assume suitable data if necessary.*

1. a. Draw a neat sketch of structure of exogenous tree and name in different parts. [6×10]
   b. Enumerate the characteristic of good timber.
2. a. Describe the chief characteristics and its use of cast iron and wrought iron.
   b. What are the properties and uses of Aluminum or Copper?
3. What are soft wood and hard wood? Define briefly with sketches of shakes (star, heard, cup, radial).
4. What are the different types of flooring? Explain in brief.
5. a. Describe the various types of sawing for conversion of timber with neat sketch.
   b. What is plywood? What are its advantage and where it is used?
6. a. What are the characteristics of varnish?
   b. Give a brief description of the process of painting on different surfaces
7. Name and sketch various forms of steel sections available in market.
8. Explain in brief **(any 4)** (5X4)
   a. Plasters
   b. Wall putty
   c. False ceiling
   d. Asbestos
   e. Insulators

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR 505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the theory as post-design postulation after the works of Masters Architect Mies van der Rohe based on his teachings, beliefs, philosophy and modern architecture. [10]

   b) How does building reflect and fulfill the cultural symbolism and psychological needs of a society. [6]

2. a) Write what you know on Walter Gropiu's modern functionalism with reference to his Bauhaus school in Germany. [8]

   b) Explain the Design Process of Christopher Alexander and Bruce Archer with a relevant example. [8]

3. a) Explain the architecture theory and the link between the Design Thinking and Built Architectural Works of Le Corbusier and his celebrated 5 points of modern architecture. [8]

   b) Why is Design Process important in your opinion? Suppose your answer with the help of an appropriate flow chart (there is no need to explain the chart). [8]

4. a) Show a Bubble Diagram and Adjacency Matrix based on your Design of a Residential Building for a Client whose 3 generations; namely their parents, themselves with children (a boy and a girl) and caretakers (a driver and a maid- husband and wife) would be living under the same roof. [8]

   b) Why is a Site Analysis important? How does the topography of a site provide related interesting characters to the building to be designed? Provide your explanations with suitable sketches. [8]

5. a) If you were asked to design a residence in an extreme cold climatic region like Muktinath, Mustang; what are the specific factors that you would consider to make your house comfortable using all the design tools that you have been provided in the course? [8]

   b) Write short notes on the following: [4×2]

   (i) Vitruvius
   (ii) The Modulor
   (iii)Art Nouveau
   (iv)Sustainable Design

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR 505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ ***Provide suitable example and sketches wherever necessary.***
- ✓ *Assume suitable data if necessary.*

1. a) Mention the importance of theory in architectural design. Explain the types of theory. [8]
   b) Explain design philosophy of Ludwig Mies Van der Rohe reflected in his work. [8]
2. a) Explain Norberg Schulz's theory of architecture by elaborating four main aspects of building task, viz. physical control, functional frame, social Milieu and cultural symbolization. [8]
   b) What is technique? Explain types of techniques for construction of building. [8]
3. a) Explain types of design. Explain design process taking example of your design studio project. [8+8]
   b) Explain Heuristic Reasoning and its principles. In what situation of design process is Heuristic approach more helpful? [8+4]
4. Write short notes on: (Any Four) [5×4]
   a) Five principle of new architecture by Le-Corbusier
   b) Mass element and surface element
   c) Topological and geometrical relationship
   d) New design process
   e) Pattern of language by Christopher Alexander

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAE	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR 505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Mention the importance of theory in architectural design. Explain the types of theories with suitable examples. [8+8]
2. a) Explain the five principles of new architecture of Le Corbuiser with suitable example and sketches. [8]
   b) Explain the massive and skeleton system of construction of building. [8]
3. a) Explain the pattern of language by Christopher Alexander with suitable example & sketches. [8]
   b) Explain the importance of material, method of construction, environment & energy in design of building. [8]
4. Explain design process taking example of your design studio project with suitable sketches. [16]
5. Write short notes on: [4x4]
   a) Bauhaus
   b) Site analysis
   c) Language of form
   d) Building tasks as cultural symbolism.

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	**Regular**		
Level	BE	**Full Marks**	80
Programme	B. Arch.	**Pass Marks**	32
Year / Part	II / I	**Time**	3 hrs.

Subject: - Design Theory I *(AR505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1 Define architectural theory. Explain whether 'building task' can be explained as thematic theory or normative theory or both. (4+12)

2 Define architectural 'proportion'. Discuss Le Corbusier's ' anthropometric scale of proportion i.e. - the '***Modular***' by taking one of the buildings designed by him. (4+12)

Or

Define architectural 'form'. Discuss the design principles focusing on architectural form by taking example of one of the buildings designed by Mies van der Rohe. (4+12)

3 Explain 'building technique'. Discuss the relation between building technique and the building form with suitable examples. (8+8)

4 Describe the 'design process' involved in design thinking. Discuss how heuristic reasoning in architecture help to come up with creative design solutions by taking example of one of the 'design studio' projects you did. (8+8)

5 Differentiate between (Any Two) (8+8)

a. Topological and geometrical relation (in architectural form)
b. Social and cultural milieu
c. Site Planning and Zoning

***

12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Explain the importance of theory in architectural design? Illustrate it's role with suitable examples of architectural works. [4+6]
2. How is scale and proportion important to achieve an interesting architectural form? Explain Le-Corbusier's five points of architecture with sketches? [3+7]
3. What are the key components of building tasks and form? Explain the Massive and Skeleton system of construction of buildings. [5+5]
4. What are the key environmental design factors that an architect should consider while responding appropriately to the architectural design problems? Use sketches and illustrations. [10]
5. Define architectural design thinking? Explain about Old and New design process in architecture. [4+6]
6. What is the significance of site analysis in Site Planning? [10]
7. Write short notes on: (any four) [4×5]
   i) Squatter settlements
   ii) Site analysis
   iii) Social context in Architecture
   iv) Significance of Case studies in Architectural Design Process
   v) Distinction between Urban and rural context
   vi) Neo-classical Architecture

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15 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Write what you know about the famous Senior Artillery Officer and World's First Known Engineer, **Marcus Vitruvius Pollio.** **(10)**

2. Who was **Mies van der Rohe?** Explain his beliefs, philosophy and master pieces. **(10)**

3. **(a)** What is a Form? What are the constituents of a form? **(10)**
   (b) Explain what is technique? Give suitable examples. **(10)**

4. **(a) Explain the General Design Process with a complete flow chart.** **(18)**
   (b) What are the specific considerations that you would fulfill if you were designing a residence in the Terai Region? **(10)**

5. Write Short Notes on (any 6 only): (2x6)
   (a) Vastu Sastra
   (b) Bauhaus
   (c) Physical control
   (d) Style
   (e) Analogic and Canonic designs
   (f) New Design Processes
   (g) Sustainable architecture

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Tribhuvan University
Institute of Engineering
Kathmandu Engineering College
2070 Falgun 21

Exam	Final Assessment		
Level	B. Arch	Full Marks	80
Program	Architecture	Pass Marks	32
Year/Part	II/I	Time	2 hrs

Subject: Design Theory I

Candidates are required to give their answers in their own words as far as possible
Attempt **ALL** questions
The figures in the margin indicate ***Full Marks***
Assume suitable data if necessary
You may use sketches to help illustrate your answer

1. What do you know about **Marcus Vitruvius Pollio** (born c. 80–70 BC, died after c. 15 BC) write in detail? **(10)**

2. Write what you know on ***Art Nouveau*** and Eugène Emmanuel Viollet-le-Duc. **(10)**

3. (a) Explain the **Building tasks** in detail. **(10)**
   (b) What is technique? **(10)**

4. (a) Who was **Christopher Alexander?** Write what you understand on his design process providing suitable examples. **(12)**

   (b) What are the common steps in General Design Process? Explain briefly. **(16)**

5. Write Short Notes on: (2x6=**12**)
   i) Vastu Sastra
   ii) The Bauhaus school
   iii) Physical control
   iv) Style
   v) Heuristic approach
   vi) Old Design Processes

16 · TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1/ Architecture is a practical art but what is Architecture in theory? [9]

2/ Match the following: Match column 1 with column 2 in following question. Write the matching number of column 2 in the blank space in column 1. [1×13]

Column 1	Column 2
a) An occurrence, circumstance, or fact that is perceptible by the senses. Phenomenon	I. Geometrical relationship
b) Following which the whole Universe gets good health, happiness and all round prosperity. Human Beings attain divinity with this knowledge it followers get not only worldly pleasures but also experience heavenly bliss. _____	II. Old Design Processes
c) Italian author, artist, architect, poet, priest, linguist, philosopher, cryptographer and general Renaissance humanist polymath and often seen as a model of the Renaissance "*universal man*". - _____	III. Design Development
d) The ornamental style of art that flourished between about 1890 - 1910 throughout Europe and the United States and considered as an important transition between the historicism of Neoclassicism and Modernism. _____	IV. New Design Process
e) Villa Tugendhat, is a three-floor building which is partially set in the hill. A broad staircase joins the dining room with the garden which makes an integral part of the building. The furniture and interior details, such as door handles, curtains etc. were also designed by its architect. _____	V. Style
f) The Great Swiss Architect and City Planner. Mistaken as being of French origin. In 1917 settled in Paris, issued his book *Vers Une Architecture* (Towards a New Architecture). _____	VI. Phenomenon
g) He concluded that a description of architectural totality has to be carried out by means of three basic dimensions of building task, form and techniques. _____	VII. Art Nouveau
h) It relates to the means of supporting any architectural structure. It includes different elements of building such as foundation, superstructure and the roof that include various construction materials such as mud, stone, brick, timber, reinforced concrete, steel and glass construction materials etc. Technique	VIII. Conventional relationship
	IX. Technique
	X. Heuristic approach

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i) It provides an identity of the particular object. It contributes to be felt clear and distinguished tangibly, consisting of three basic elements called as primary, secondary and tertiary elements. _____

j) Carefully designed, constructed and sited building can use the power of the sun with mechanical or electrical devices to collect, store, distribute and control the sun's energy. In this system the designer is actually capturing the power of the sun through _____

k) The principle, procedure, or advice that contributes in the search for a satisfactory solution by following a process of elimination until the desired solution is reached. _____

l) Christopher Alexander and Bruce Archer with the help of higher mathematics and computer pioneered and reinvented this design processes. _____

m) During this phase of design process, the schematic design is refined into the final design; it becomes important to give individual attention to each aspect, each space and each detail of the project. _____

XI. Active Solar Design

XII. Programme Formulation

XIII. Leon Battista Alberti

XIV. Christian Norberg Schulz

XV. Charles Edouard Jeanneret

XVI. Vastu Sastra

XVII. Mies van der Rohe

3. Explain Building Task by elaborating on its four main aspects, viz. Physical Control, Functional Frame, Social Milieu and Cultural Symbolization. [10]

4. Give detail description of one of the work of Architecture from bellow and discuss its meaning. [10]

   a) Syambhu Stupa
   b) Krishna Mandir, Patan
   c) Sahid Gate
   d) City Center, Kamal Pokhari, Kathmandu

5. Explain the complete general design process with the example of your design studio project. [9]

6. What is Heuristic Reasoning and in what situation of design process is Heuristic more helpful? [9]

7. Write short notes on: [20]

   a) Hypothesis
   b) Bauhaus school
   c) Social Milieu
   d) Prognatic and cononic design
   e) Miles van der Rohe

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16 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Design Theory I *(AR 505)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Five** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) How do you differentiate Hypothesis with Theory? [5]
   b) What is Vastu Shastra? What do we attain by properly following it? Give examples where Vastu Shastra had been used in our Nepalese architecture. [5]
   c) What is the importance of form in design? Explain. [6]
2. a) What do you know about Mies van der Rohe and his works? What was his philosophy for the modern architecture? [5]
   b) Who was Le Corbusier? Explain his 5 principles of modern architecture. [5]
   c) What do you understand by site analysis? Explain. [6]
3. a) Christian Norberg Schulz defined architecture saying "....We may conclude that a description of architectural totality has to be carried out by means of three basic dimensions of building task, form and techniques.....". Explain. [10]
   b) How do you consider the Environment Design Factor for designing a building in any site at respective region? [6]
4. a) What are the common procedures in Design Process? [6]
   b) Explain the old design process recommended by Hans Gugelot, Morris Asimov and J.C. Jones. [10]
5. What are the different social factors that affect the built environment? Describe with sketches. [16]
6. Write short notes on: (any four) [4×4]
   a) Mass element and space elements
   b) Plastic or perforate elements
   c) Bauhaus
   d) Passive solar system
   e) Green house effect

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Tribhuvan University
Institute of Engineering
Engineering College
2073 Magh 24

Exam	Alternate Day Test 3		
Level	BE	Full Marks	20
Program	Architecture	Pass Marks	8
Year / Part	II / I	Time	45 mins.

Subject: Design Theory I

Attempt all questions

1. What are the Constituents of a form show with illustration? (7)
2. What is technique? Explain with examples. (7)
3. What do you understand by Style? What is its importance? Explain. (6)

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Tribhuvan University
Institute of Engineering
Engineering College
2073 Mangsir 19

Exam	ADT I		
Level	BE	Full Marks	20
Program	BAE	Pass Marks	8
Year / Part	II / I	Time	45 mins.

Subject: Design Theory I

Attempt all questions:

1. Explain the complete Design Process with the help of needful illustrations and charts. (10)
2. Why is Site Analysis important in Design Process? Explain (10)

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Tribhuvan University

Institute of Engineering

Engineering College

2073 Falgun

Exam	Final Assessment		
Level	BE	Full Marks	80
Program	BAE	Pass Marks	32
Year / Part	II / I	Time	2 Hrs

Subject: AR 505 Design Theory I

Attempt all Questions. The numbers in the brackets indicate marks. Support all your answers with related examples and needful sketches as far as possible.

1. Write what you know about **(a)** the famous soldier Senior Artillery Officer and World's First Known Engineer **Marcus Vitruvius Pollio. (b)** ***Neo-classical*** architecture? **(8+8)**

2. **(a)** Who was **Mies van der Rohe?** What do you know on his beliefs, philosophy and masterpieces? **(b)** Write on ***Art Nouveau*** and architects involved during that period. **(8+8)**

3. **(a)** What is **Form**? What are its compositions?
   (b) Explain **technique** with suitable examples? **(8+8)**

4. Explain the General Design Process with a complete flow chart; and what are the specific considerations that you would fulfill if you were designing a beautiful, functional and a comfortable residence for a wealthy businessman at **Terai Region**. **(16)**

5. Write Short Notes on (answer any ~~4~~ 3 only): (4x4=16)
   (a) Vastu Sastra
   (b) The Bauhaus school
   (c) Functionalism
   (d) Environment & sustainable architecture
   (e) Plastic & perforate elements
   (f) Analogic and Canonic designs
   (g) Passive design
   (h) Orientation

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	**Full Marks**	40
Programme	BAR	**Pass Marks**	16
Year / Part	II / I	**Time**	1½ hrs.

Subject: - Building Construction II (*AR 504*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Discuss on the commonly used formwork in Nepal and compare them. Sketch the elevation of flying shoring with label. [4+4]
2. Discuss the different type of structural system of a building with necessary sketches and label. [8]
3. Discuss on the design consideration while designing windows. Sketch timber window elevation and section. [4+4]
4. Design a suitable Timber stair for a space in an private building where the space dimension are 4000 mm × 2200 mm and floor to floor height is 3150 mm. Support your answer with sketches showing plan, section. [8]
5. Write short notes on: (Any Two) [2×4]
   a) Battened, ledged braced, framed door.
   b) Type of basement construction according to design.
   c) Mass retaining wall.

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	II / I	Time	1 ½ hrs.

Subject: - Building Construction II *(AR 504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. After the 2015 earthquake, lots of building has to be retrofitted. Discuss on any one method you will use in retrofitting the foundation of load bearing building with sketches and label. [8]
2. Enlist different type of shallow and dip foundation. Define "Scaffolding". Describe raking shore in details with appropriate design consideration and figure. [8]
3. Discuss the major component of door with suitable plan and section. What are the major considerations that should be made while defining the position of doors and windows? [8]
4. Design a suitable stair for a space in an educational building where the space dimension are 3600 mm × 5100 mm and floor height is 3450 mm. support your answer with sketches showing plan, section. [8]
5. Write short notes on: (Any Two) [2×4]
   a) Counterfort retaining wall
   b) Basement water proofing methods
   c) Double Roof Construction

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BAR	Pass Marks	16
Year / Part	II / I	Time	1 ½ hrs.

Subject: - Building Construction II *(AR 504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Discuss the need of shoring in construction. Explain (any two) type of shoring that is being used in building in traditional settlement of Kathmandu after 2015 earthquake. Explain with sketches labeling essential components. [2+6]
2. Briefly discuss the different type of structural system of building with sketch of the load transfer. Sketch the typical cross section of a RCC pad foundation with reinforcement detail. [4+4]
3. Write down the advantage of metal door. Ketch the plan, elevation and vertical section of framed and paneled door. [2+6]
4. Design a suitable well staircase for a space in educational building where the space dimension are 3600 mm × 4800 mm and the floor to floor height is 3450 mm. [8]
5. Write short note on: (Any two) [4×2]
   a) Timber double roof
   b) Basement water proofing
   c) Types of retaining wall

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	BAE	Pass Marks	16
Year / Part	II / I	Time	1½ hrs.

Subject: - Building Construction II *(AR 504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *<u>All</u> questions carry equal marks.*
- ✓ *Assume suitable data if necessary.*

1. Explain the temporary construction works. Write down the characteristics and requirements of good frameworks.
2. Explain the types of building structures and parts of the building in frame structure with the help of sketches.
3. Describe retaining wall and its use. Explain the precautionary measures taken while construction of retaining wall.
4. Write the types of door used in a building with neat sketches.
5. For a given space of 3500mm x 6000mm with floor height 3300mm in a office building, design a suitable staircase.(figure with dimension is necessary)

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13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	II / I	Time	1 ½ hrs.

Subject: - Building Construction II *(AR504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are the different types of staircases? Design a suitable staircase in a space of 5000mm x 2300mm to traverse a height of 3000mm. Support your answer with neat sketches. (3+7)

OR

What are the requirements of a good staircase? Design a suitable staircase in a space of 5800mm x 4500mm to traverse a height of 3100mm. Support your answer with sketches. (3+7)

2. Explain the different types of windows. Design a suitable steel window for an opening 2800mm x 1500mm.Support your answer with suitable details and sketches. (4+6)

OR

Explain the different door types. Design a suitable door with a fixed glass glazing attached in an opening 2800mmx1200mm. Provide sketches and details in support of your answer. (4+6)

3. With the help of suitable sketches explain the shores used in temporary construction. (6)

OR

When is underpinning required. Explain the precautions taken in undertaking this temporary construction work. (6)

4. Explain with the help of neatly illustrated sketches, any **TWO** (2) of the following: (4+4)
   a. Flush doors
   b. Failure of RCC Structures
   c. Basement tanking

5. Make neatly illustrated sketches of any **TWO** (2) of the following: (3+3)
   a. Formwork for beam and slab construction
   b. Timber Double Roof
   c. Stone mason's scaffold

***

IS TRIBHUVAN UNIVERSITY	Exam.	Regular	
INSTITUTE OF ENGINEERING	Level	BE	Full Marks 40
Examination Control Division	Programme	B. Arch.	Pass Marks 16
2072 Chaitra	Year / Part	II / I	Time 1 ½ hrs.

Subject: - Building Construction II *(AR504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What do you understand by the term "Economy in formwork"? Explain essential components of incline or raking shore with the help of necessary sketches. [3+5]

OR

Define temporary works. Explain in brief about any 2 (two) temporary construction works with neat and labelled sketches. [2+6]

2. Define retaining structure. Sketch out a typical cross sections of a stone breast wall and RCC retaining wall. [2+2+4]
3. What are the various components of RCC framed building? Sketch out the typical cross section of a RCC pad foundation with reinforcement detail. [3+5]
4. Define roof. Write down the importance and contribution of timber in conventional traditional roofing system in various types of building. Sketchout line elevation of various types of roof on the basis of configuration. [2+4+2]

OR

Define opening and skylight. Explain the single and double (timber roof) showing sectional elevation sketches with all necessary elements. [2+6]

5. What is meant by staircase? Design a timber staircase for a space available of 2250 mm× 5000 mm dedicated for a staircase well in a residential building. The height to encounter between floors is 3300 mm. Together with the plan and section of staircase provide tread and riser detail in support of your design. [2+6]

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13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	II / I	Time	1½ hrs.

Subject: - Building Construction II *(AR504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Make sketches to illustrate your answer.*
- ✓ *Assume suitable data if necessary.*

1. Describe the formwork for column, Beam and slab with necessary sketches. [10

OR

✓Define underpinning of existing strip foundation. Distinguish between brick layer's scaffold and mason's scaffold with sketches. [2+4+4]

2. Define framed structure. Give a typical cross sectional sketches of RCC footing showing plinth tie beam. [4]

3. Write detail about the basement construction and basic principles of water proofing of basement with sketches. [4]

4. Explain about the metal doors and windows. What are the precautions to be taken while constructing such type of metal openings? [4+4]

5. Draw plan section and hand railing details with baluster of timber staircase. [2+2+4]

6. Write short notes on: [3+3]

a) Various roof covering materials.
b) Queen post roof truss.

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13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	B. Arch.	Pass Marks	16
Year / Part	II / I	Time	1½ hrs.

Subject: - Building Construction II *(AR 504)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Four** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe the shoring used to support the intermediate walls, elaborating the various components and their erection procedures. [10]

2. Design a suitable timber stair in an entrance lobby (4m×3m and 2.3m height) of a residential building. Draw plan and section to support your design. [2+4+4]

3. With quick sketches, explain different types of doors on the basic of arrangement of components? Design a suitable door with a visor of 200mm×450mm for an opening to a classroom, where the opening size is 2400mm×1200mm. [4+6]

4. Explain the characteristics and advantages of R.C.C structure. Explain R.C.C. foundation with suitable sketches. [5+5]

5. Write short notes on:(any two) [5+5]
   a) Retaining wall
   b) Precast Frames
   c) Purlin Roof

***

13 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	B.Arch.	Pass Marks	16
Year / Part	II / I	Time	1½ hrs.

Subject: - Building Construction II

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any **Four** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. Describe the types of scaffolding commonly used. Give neat sketches including the names of the component. [4+6]
2. Describe the type of single timber slopping roof. Give neat sketches of key elevation and necessary details including the names of the component. [4+6]
3. What is retaining wall? Explain the various classification of window with line diagram. Write down the advantages of precast concrete. [2+4+2]
4. Design a single flight timber staircase for a entrance lobby space in residential building, where the space dimensions are 3500 × 7500mm and floor to floor height is 2600mm. Support your answer with neat illustrated sketches. [4+6]
5. Write short notes on: (any two) [2×5]
   a) Cast In-situ
   b) Panel Door
   c) Releasing agent for formwork
   d) Roofing Materials

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. Engineering College
Kathmandu
Falgun 2, 2073

Exam	ADT II		
Level	Arch	Full Marks	20
Program	Arch	Pass Marks	8
Year /Part	II/I	Time	45 mins

Subject: Building Construction -II

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.

1) What do you understand by opening in a building? List out different types of window and explain about bay window in details. [2+2+4=8]

2) For a given space of 2400mm X 5000mm with floor height 2800 mm in a residential building, design a suitable Staircase. (*figure with dimension is necessary*) [8]

3) Draw neat Sketch of any two of the following [4]

   a. battened, ledged doors & braced doors
   b. glazed or sash doors
   c. skylight

Engineering Colleges
Kathmandu
Falgun, 2073

Exam	Final Assessment - I		
Level	Arch	Full Marks	40
Program	Arch	Pass Marks	16
Year /Part	II/I	Time	1 1/2 Hr

Subject: Building Construction -II

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.

1) What do you understand by the term "Formwork"? Give at least five major requirements of a good formwork. [10]

OR

Explain with a sketch what you understand by the term "Underpinning"? Distinguish between brick layer's scaffold (single) and mason's scaffold (double) with sketches.

2) What are the major considerations that should be made while defining the position of doors and windows? Draw a neat sketch of a door showing the following components: Head, Panels, Transom, Styles, Intermediate rails, Mullion, Hold fast and horn. [10]

3) Sketch clearly large view to show details of any two of the following
   a. Treads with rounded nosing.
   b. Tongued risers
   c. Wall or outer string
   d. Newel, Hand rail and balustrade. [10]

4) Describe brief with sketches of any two of the following [10]

   a. King post roof truss
   b. Basement Construction
   c. Battened Ledged and Braced Doors

Engineering College
Kathmandu
20 Mangshir 2073

Exam	ADT I		
Level	Arch	Full Marks	20
Program	Arch	Pass Marks	8
Year /Part	II/I	Time	45 mins

Subject: Building Construction –II

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.

1) What do you understand by the term "Formwork"? Give at least five major characteristics of a good formwork. [8]

OR

What are the types of scaffolding commonly used? Describe any two of them in brief. [8]

2) Describe in detail the essential components of ranking shore showing neat sketches to illustrate your statement. [6]

3) Write short notes on any two: [6]

- Formwork for beam and slab construction.
- Cantilever scaffolding.
- Single Flying or Horizontal Shore.

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2079 Baishakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I (*AR 506*)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary figures are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. a) What do you understand by micro climate and macro climate? Describe the factors affecting the urban climate. [2+4]

   b) It is required to cover a window of 1.35 m. high against direct sunlight by a horizontal louver fixed 150 mm above the upper edge of the window. What should be the effective projection of the louver in front of the wall? The wall is facing South-east. The full coverage is to be obtained at 10.00 A.M. on 23 july in Dharan, Nepal. Draw neat diagrams for the calculation. [10]

2. a) Explain the thermal control techniques for warm humid climate with neat and clean sketches. [6]

   b) Find out the U-value of the composite wall section assuming the following respectively from exterior to interior:

i)	External surface resistance	$1/f_o$	= 0.053m°C/W
ii)	Conductivity of brick work 110 mm thick	K	= 1.15 W/m°C
iii)	Air cavity resistance 50 mm thick	R	= 0.176 m^2°C/W
iv)	Conductivity of lightweight brick 110 mm thick	K	= 0.374 W/m°C
v)	Conductivity of gypsum plaster 12 mm thick	K	= 0.461 W/m°C
vi)	Internal surface resistance	$1/f_i$	= 0.123 m°C/W

   Draw the typical section of the composite wall. Calculate the rate of heat flow through the wall if the wall is 3 m high and 5 m long. The temperature of inside wall is 22°C and outside is 36°C. [10]

3. a) What are the climates found in Nepal? [6]

   b) What are the characteristics of hot climate? If you are designing a building for this reason, what are the considerations would you take for design of a particular building? [10]

4. a) Nepal is prone to earthquake. As a designer what design consideration and construction method would you apply to build earthquake resistant building for future havoc? [12]

   b) Describe about the thermal balance in a human body. [4]

5. Write short notes on: (Any Four) [4×4]

   a) Geometry of solar movement
   b) Interstitial condensation
   c) Internal comfort
   d) Importance of Building Bye-laws
   e) Thermal resistance and insulation
   f) Wind rose

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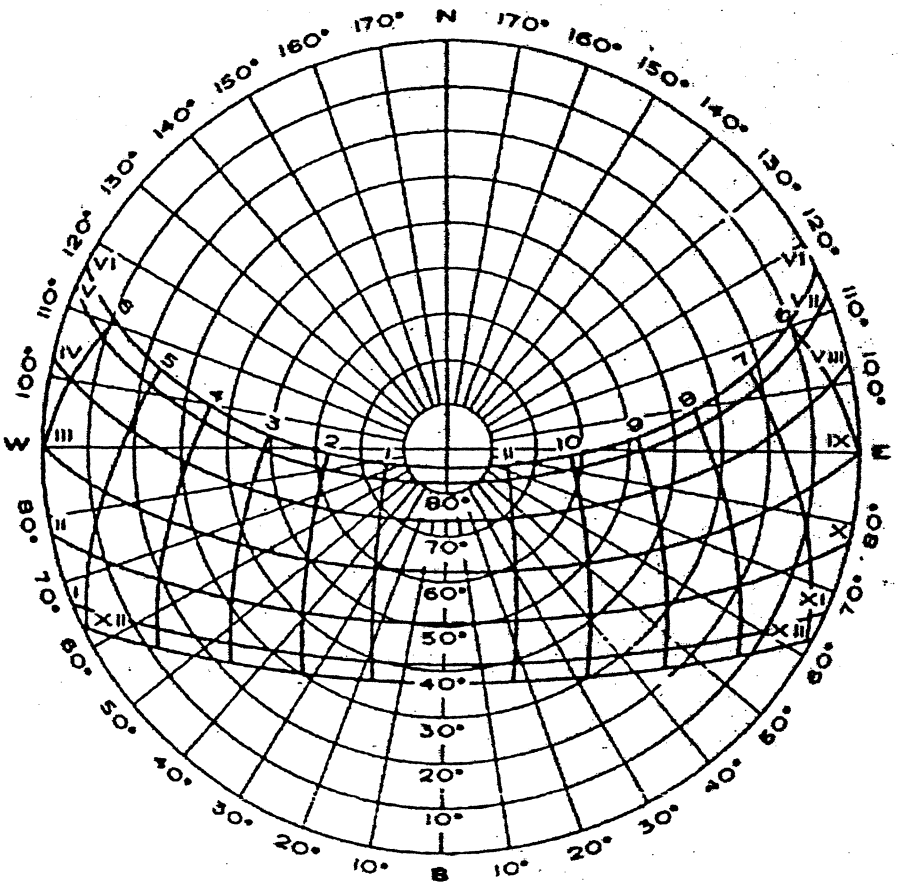

28° N LATITUDE

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2078 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR 506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary figures are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the geometry of solar movement with neat sketches. What are the factors affecting climate of a place? Explain. [2+4]

   b) It is required to cover a window of 1.50 m high against direct sunlight by a horizontal louver fixed 150 mm above the upper edge of the window. What should be the effective projection of the louver in front of the wall? The wall is facing South-east. The full coverage is to be obtained at 9:00 AM on 23 July in Dharan, Nepal. Draw neat diagrams for the calculation. [10]

2. a) Explain the thermal control techniques for cool temperature climate with neat and clean sketches? [6]

   b) Find out the U-value of the composite wall section assuming the following respectively from exterior to interior:

External surface resistance	$1/f_o = 0.076\ m^2°C/W$
Conductivity of brick work 110mm thick	$K = 1.15\ W/m°C$
Air cavity resistance 50mm thick	$R = 0.176\ m^2°C/W$
Conductivity of brick work 230mm thick	$K = 1.15\ W/m°C$
Conductivity of wood wool 25mm thick	$K = 0.093\ W/m°C$
Conductivity of gypsum plaster 12mm thick	$K = 0.461\ W/m°C$
Internal surface resistance	$1/f_i = 0.123\ m^2°C/W$

   Draw the typical section of the composite wall. Calculate the rate of heat flow through the wall if the wall is 3 m high and 5 m long. The temperature of inside wall is 22°C and outside is 36°C. [10]

3. a) What do you understand by internal comfort? Explain how internal comfort can be attained by human being? [6]

   b) What are the characteristics of composite climate? If you are designing a building for this climate, what are the considerations you would take for design of a particular building? [10]

4. a) Nepal is earthquake prone zone. As a designer what design consideration and construction method would you apply to build earthquake resistant building. [12]

   b) What are the importance and drawbacks of local bye-laws? [4]

5. Write short notes on: (Any Four) [4×4]

   a) Urban climate
   b) Thermal balance in a human body
   c) Prevention method of condensation
   d) Thermal resistance and insulation
   e) Wind rose

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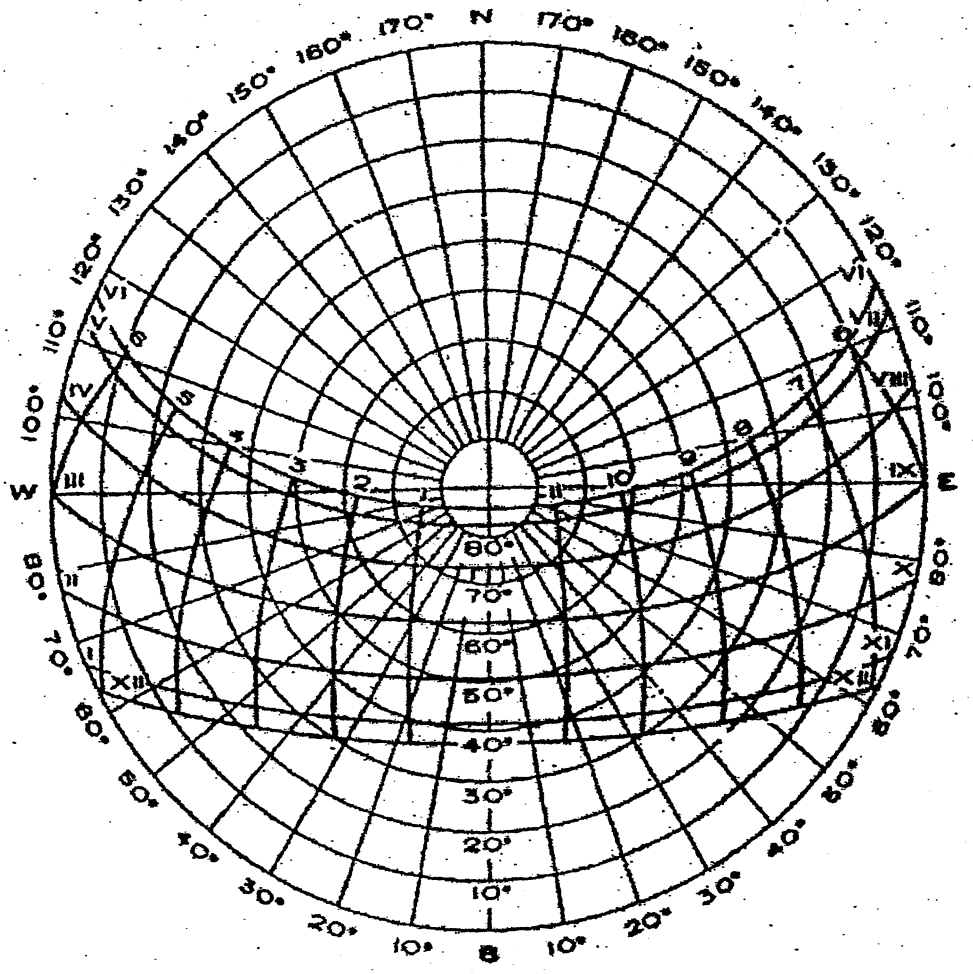

28° N LATITUDE

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BAR	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR 506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary charts are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. a) Describe about the solar absorption and reflection on earth with relevant sketches. [6]

   b) You are summoned by a client to design a residence in your locality in Kathmandu. What should be the effective horizontal projection above the window in the wall if the wall is facing south at the given latitude? You have fixed the height of the window as 1500 mm and the projection is to be placed 100 mm above the upper edge of the window. The full coverage is to be obtained at 10 am on 22 June. Show necessary sketches. [10]

2. a) Why do we need to have a clear understanding of climatology before designing of any new buildings? Also, write about the climatic factors that affect the climate. [3+5]

   b) Describe solar radiation. What are some of the ways to control solar radiation inside the buildings? [3+5]

3. a) Define time lag and its importance. Also, explain decrement factor. [2+2]

   b) Determine the U-value of the composite wall section using the following data from exterior to interior.

External surface resistance	$1/f_o = 0.072\ m^2°C/W$
Thermal conductivity of brick work 110mm thick	$K_{bw} = 1.05\ W/m°C$
Air cavity resistance 50mm thick	$R_{ac} = 0.174\ m^2°C/W$
Thermal conductivity of stone work 350mm thick	$K_{bw} = 1.295\ W/m°C$
Thermal conductivity of mud plaster 25mm thick	$K_{mp} = 0.22\ W/m°C$
Internal surface resistance	$1/f_i = 0.123\ m^2°C/W$

   Also draw the typical wall section with dimensions. [10+2]

4. a) You are going to design a house in the mountainous region of Nepal. Write about its general climatic conditions. Also, suggest some of the design parameters to consider related with orientation, space planning, openings, wall and roof to achieve thermal comfort inside the house. [8]

   b) Explain heat gain and loss in a building with relevant sketches. [8]

5. Write short notes on any two: [2×8]

   a) Earthquake resistant building design of load bearing houses in rural areas of Nepal
   b) Humidity and its control
   c) Improving byelaws in Kathmandu Valley

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LATITUDE 28° NORTH

LATITUDE 28° SOUTH

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	BAE	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR 506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ ***Necessary figures are attached herewith.***
- ✓ *Assume suitable data if necessary.*
- ✓ *Give sketches to support your answer.*

1. a) Design a horizontal shading device for the wall facing south. Complete shading has to be achieved on 15th May at 10 ~~g.m.~~ P.M. The room has floor height of 3000mm, sill height of 800mm and lintel height of 2300mm. [10]

   b) Write about the solar chart. [6]

2. a) Calculate U-value of a composite wall section using following data from exterior to interior. Also draw a wall section. [10]

External surface resistance	$1/f_o = 0.056\ m^{2o}C/W$
Thermal conductivity of plaster, 12mm thick	$K_{cp} = 0.32\ W/m^oC$
Thermal conductivity of brick work, 110mm thick	$K_{bw} = 0.75\ W/m^oC$
Air cavity resistance	$R_{ac} = 0.175\ m^{2o}C/W$
Thermal conductivity of brick work, 230mm thick	$K_{bw} = 0.55\ W/m^oC$
Thermal conductivity of mud plaster, 25mm thick	$K_{mp} = 0.21\ W/m^oC$
Internal surface resistance	$1/f_i = 0.056\ m^{2o}C/W$

   b) Explain Thermal balance in a human body with sketches. [6]

3. What are the characteristics of climate in Terai region of our country? What would you suggest for designing a building in terms of wall, roof, opening design, orientation and space planning in that climate? [16]

4. How would you suggest to design an earthquake safe building in rural area of Nepal? Support your answer with sketches. [16]

5. Write short notes on *(Any Four)* [4x4]
   a) Urban Climate
   b) 'U' value
   c) Thermal control technique for cool climate
   d) Condensation and its prevention
   e) Selective Transmittance

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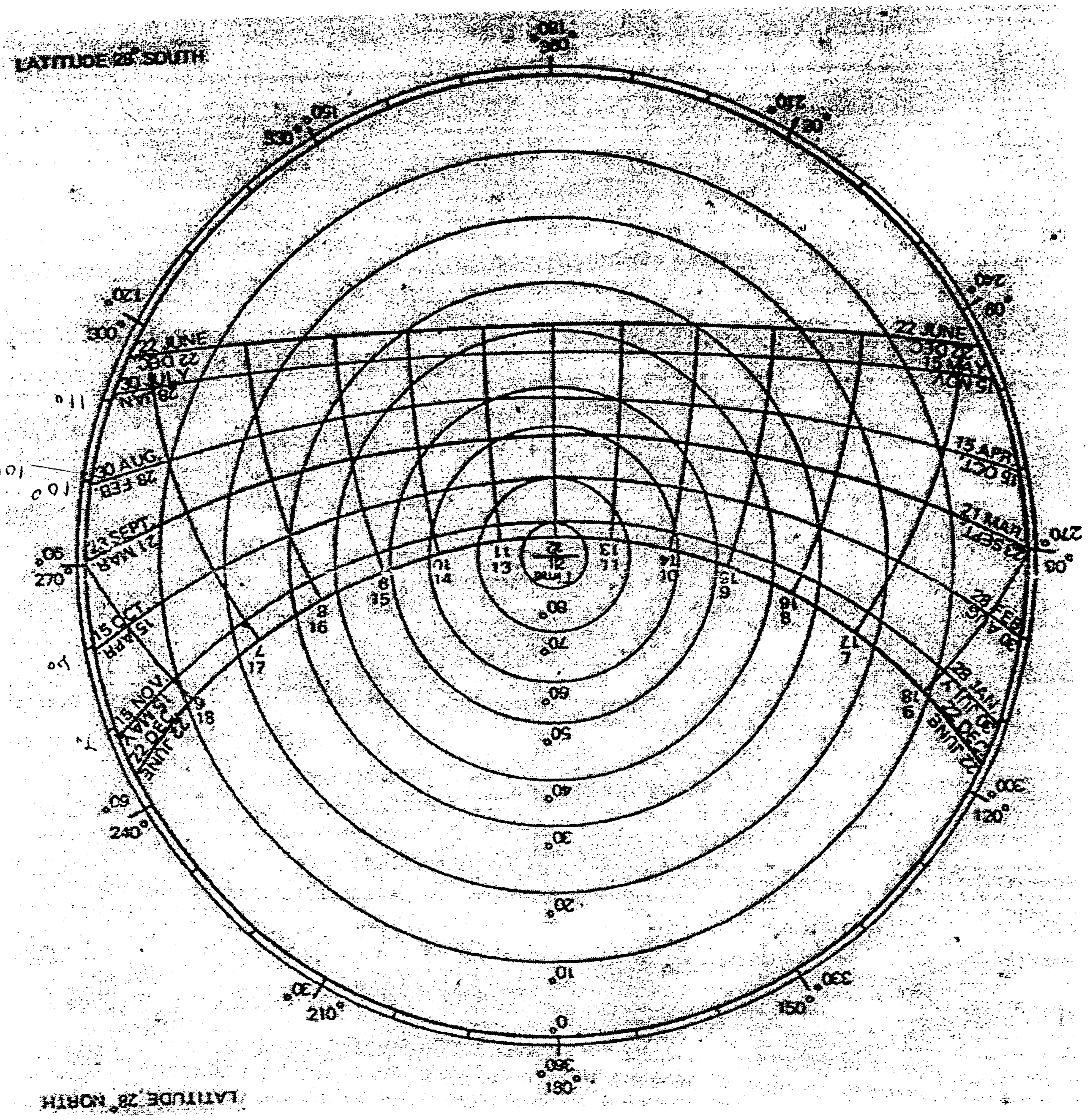

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15 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ ***Necessary Chart is attached herewith.***
- ✓ *Assume suitable data if necessary.*

1. a) What are different angles used to define the Sun's position? (Refer attached figure) [4]
   b) Find the following values for 22 June at 11 AM for south facing wall in Pokhara. [12]
      i) Solar altitude angle
      ii) Solar azimuth angle
      iii) Wall azimuth angle
      iv) Angle of Incidence
      v) Horizontal shadow angle
      vi) Vertical shadow angle
2. a) Write the climate characteristics of Terai region of Nepal. [4]
   b) Explain in brief the main design responses for shelters design in Terai with the help of sketch. [12]
3. a) Define Thermal transmittance, thermal conductance and Resistance. [4]
   b) Determine the U-value of stonewall with both side cement plaster as follows: [12]
      i) Conductivity of 300 mm thick stone works (K_s) = 1.295 W/m°C
      ii) Conductivity of 25 mm cement plaster (K_c) = 0.16 W/m°C
      iii) Internal surface resistance ($1/f_i$) = 0.123 m^2°C/W
      iv) External surface resistance ($1/f_e$) = 0.053 m^2°C/W

   Draw the wall section with the dimensions.
4. Describe the earthquake resistance building design techniques for load bearing building in rural areas of Nepal. Draw the necessary sketches to support your answer. [12+4]
5. Write short notes on: (any two) [8+8]
   i) Psychological comfort
   ii) Climatic elements
   iii) Thermal balance in a room

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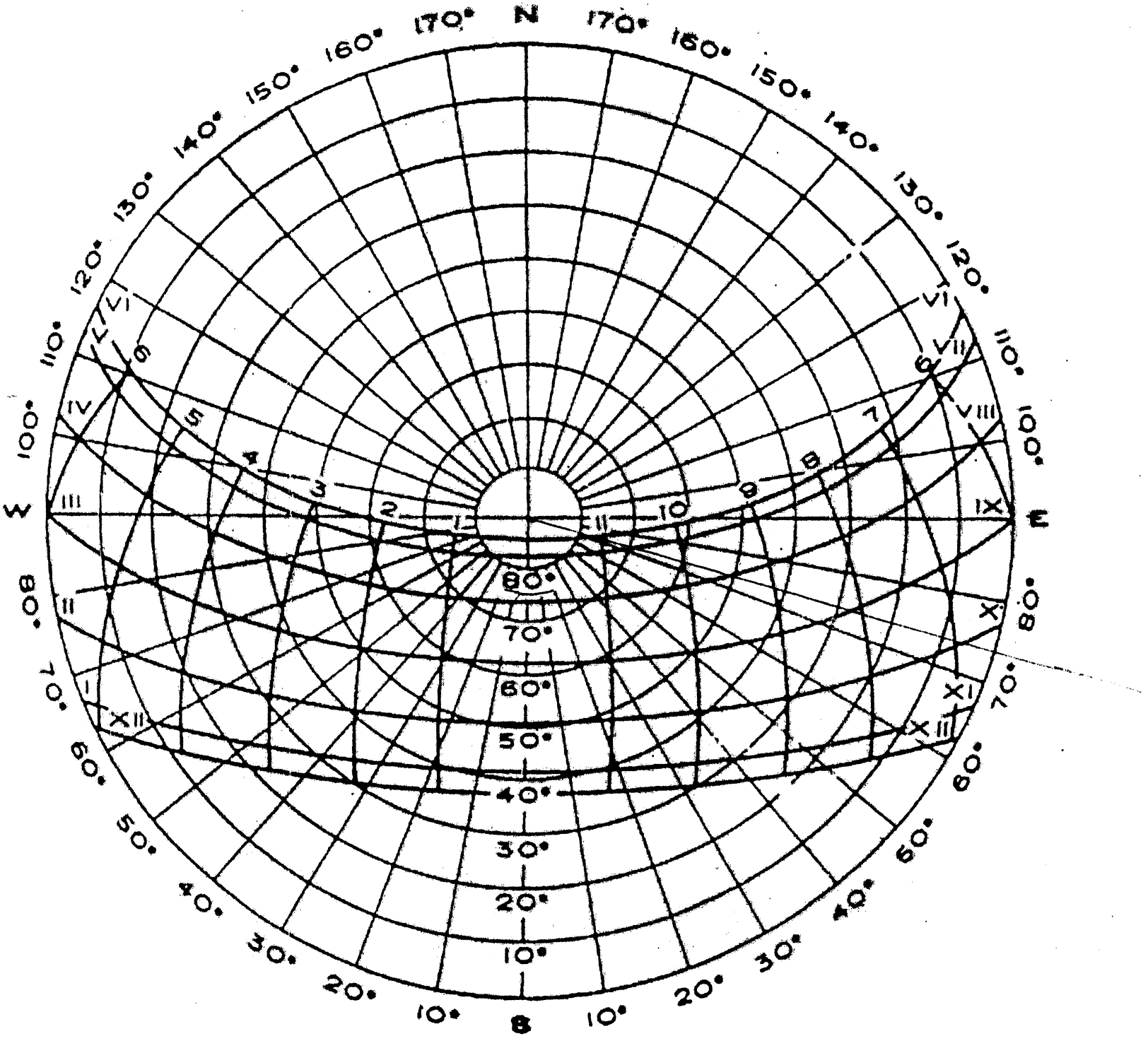
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15 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary figures are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. a) Write the characteristics of climate in Terai region of Nepal. [8]
   b) Describe with the help of sketches and examples, the main design criteria for shelter in Terai region of Nepal. [8]
2. a) Explain geometry of solar Movement with observer at the center. How does seasonal variation occur according to movement of the sun at different times of the year? [8]
   b) A building is located in 28°N latitude. It is required to shade the sun at 1400 hrs for a representative day of August. The orientation of building is 30° west of south. Design a horizontal shading device for this building, if window is sized as 1200mm×1000mm (Height×Length). It is required to keep the shading device 100 mm above the lintel level. [8]
3. a) Define thermal transmittance (U-value). Calculate the U-value of the cavity wall section assuming the following data respectively from the exterior to interior. [8]
      i) External surface resistance, 1/f = 0.053 m^2°C/W
      ii) Conductivity of brick work 110 mm thick K = 1.15 W/m°C
      iii) Resistance of air cavity 50 mm thick, R = 0.176m^2°C/W
      iv) Conductivity of concrete block 150 mm thick K = 1.44 W/m°C
      v) Conductivity of plaster 12 mm thick, K = 0.461 W/m°C
      vi) Internal surface resistance, 1/f = 0.123m^2°C/W
   b) Draw the typical section of the cavity wall and calculate the rate of heat flow through the wall if the wall is 3 m high and 5 m long. The temperature of inside wall is 26°C and outside is 36°C. [8]
4. a) What do you understand by earthquake resistant building? Describe some cases of building failures during earthquake 2072/01/12 in Nepal. [8]
   b) Explain with the help of the sketches, the design and construction of Earthquake resistance building for Nepal. [8]
5. Write short notes on: (any four) [4×4]
      i) Heat exchange of human body with sketch
      ii) Characteristics of hot and arid climate
      iii) Problems due to condensations
      iv) Time lag and Decrement factor
      v) Urban climate

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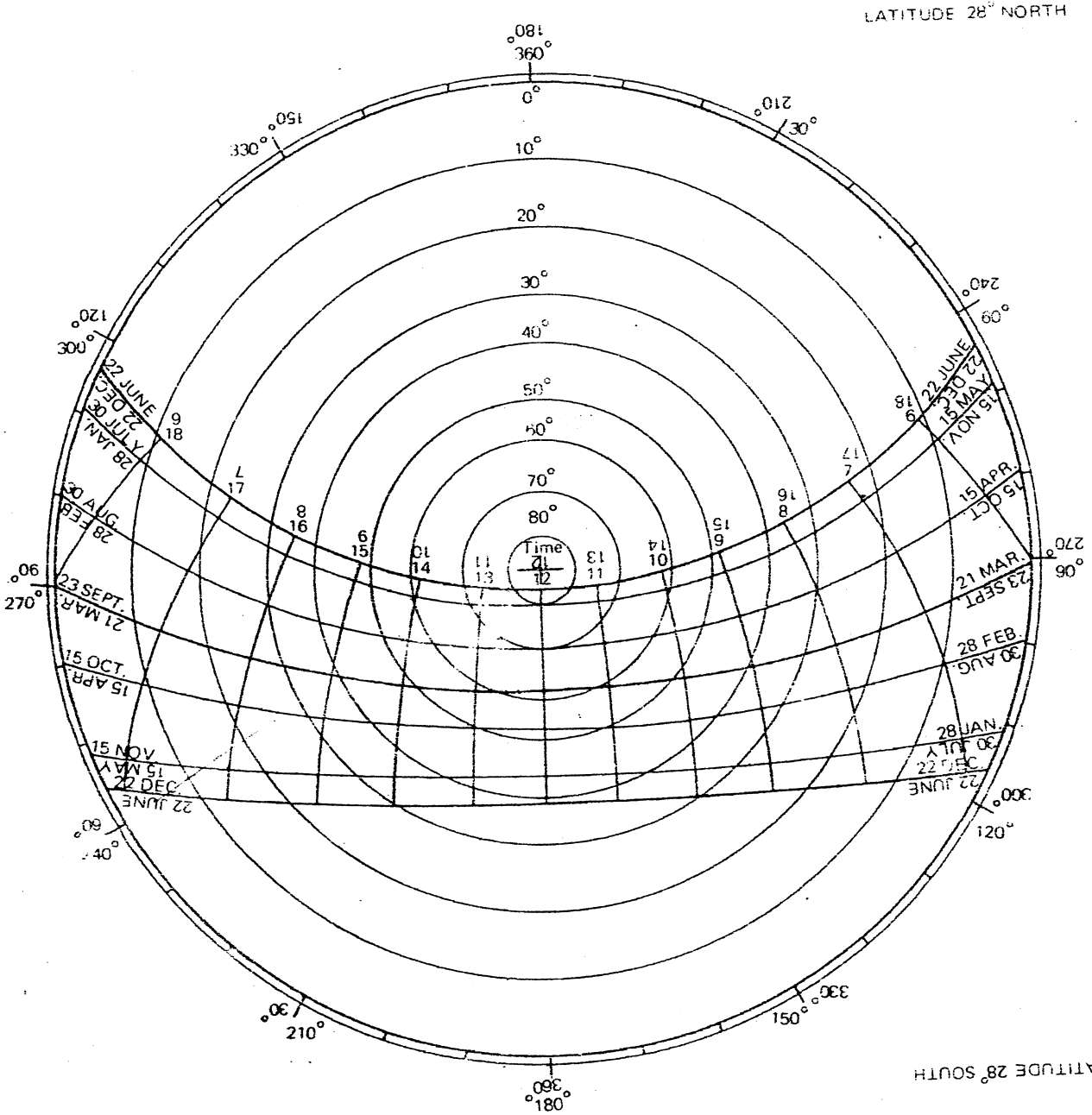
LATITUDE 28° NORTH



LATITUDE 28° SOUTH

12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	New Back (2066 & Late Back)		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary figures are attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the shadow angles and shading devices with the help of sketches. [6]

0] b) Describe with the help of sketches and examples, the different types of solar radiation control techniques for the building design in hot climate. [10]

0] 2. (a) Describe with the help of sketches the geometry of solar movement with respect to the Earth. Write the advantages of this condition for the design of building. [6]

0] (b) It is required to cover a window of 1.65 m high against direct sunlight by a horizontal louver fixed 150 mm above the upper edge of the window. What should be the effective projection of the louver in front of the wall? The wall is facing SE in Kathmandu. The full coverage is to be obtained at 10.00 A.M. on 30 July. [10]

3. a) Explain the condition of the thermal balance in a human body. [4]

b) Write the Characteristics of cool climate. Describe with the help of sketches and examples, the main design criteria appropriate for shelters in cool climate. [12]

5] 4. a) Explain with the help of sketches, thermal insulating materials for better thermal comfort in a building. [4]

b) Find out the U-value of the composite wall section assuming the following respectively from exterior to interior: [12]

i.	External surface resistance,	$1/f = 0.053\ m^2\,°C/W$
ii.	Conductivity of cement plaster with 15 mm thick,	$K = 0.159\ W/m\,°C$
iii.	Conductivity of brick work with 230mm thick,	$K = 1.15\ W/m\,°C$
iv.	Conductivity of foam slab with 25 mm thick,	$K = 0.033\ W/m\,°C$
v.	Conductivity of gypsum plaster with 12mm thick,	$K = 0.461\ W/m\,°C$
vii.	Internal surface resistance,	$1/f = 0.123\ m^2\,°C/W$

]raw the typical section of the composite wall and calculate the rate of heat flow through the wall if the wall is 3m high]d 6m long. The temperature of inside wall is 16 °C and outside is 4 °C.

Write short notes on: [4x4]

i) Historical background of Earthquake disaster in Nepal
ii) Objective of Climatology
iii) Building bye-lawa
iv) Internal comfort

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2069 chaitra Regular.

Subject: - Building Science I *(AR506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ ***<u>Necessary solar chart is attached herewith.</u>***
- ✓ *Assume suitable data if necessary.*

1. a) Describe with the help of sketches the solstice and equinox condition. Write the advantages of this condition for the design of buildings. [6]

   b) Find the following values on 30 July 9 a.m for SE facing wall for the given latitude. [10]

   i) Solar altitude angle
   ii) Solar azimuth angle
   iii) Wall azimuth angle
   iv) Horizontal shadow angle
   v) Vertical shadow angle
   vi) Angle if incidence
   vi) Horizontal component of angle of incidence

   Draw the necessary sketches.

2. a) Write with the help of sketches types of shading devices. [4]

   b) Write the characteristics of warm humid climate. Describe with the help of sketches and examples, the main design criteria for shelter in warm humid climate. [12]

3. a) Explain with the help of sketches, heat loss and heat gain in a human body. [4]

   b) Find the U-value of the composite wall section assuming the following respectively: [12]

i) External surface resistance,	$1/f = 0.076\ m^2\ °C/W$
ii) Conductivity of brick work 110 mm thick,	$K = 1.15\ W/m\ °C$
iii) Air cavity resistance 50 mm thick,	$R = 0.176\ m^2\ °C/W$
iv) Conductivity of brick work 230 mm thick,	$K = 1.15\ W/m\ °C$
v) Conductivity of plaster 12 mm thick,	$K = 0.461\ W/m\ °C$
vi) Internal surface resistance,	$1/f = 0.123\ m^2\ °C/W$

   Draw the typical section of the composite wall. Calculate the rate of heat flow through the wall if the wall is 3m high and 6m long. The temperature of inside wall is 16°C and outside is 4°C.

4. a) Write with the help of sketches ventilation by stack effect. [4]

   b) Write the historical background of Earthquake disaster in Nepal. Describe with the help of sketches to design and construction of Earthquake resistance building in Nepal. [12]

5. Write short notes on: [4×4]

   a) Micro, Macro, and Urban climate
   b) Thermal insulating materials
   c) Wind rose
   d) Importance of building by-laws

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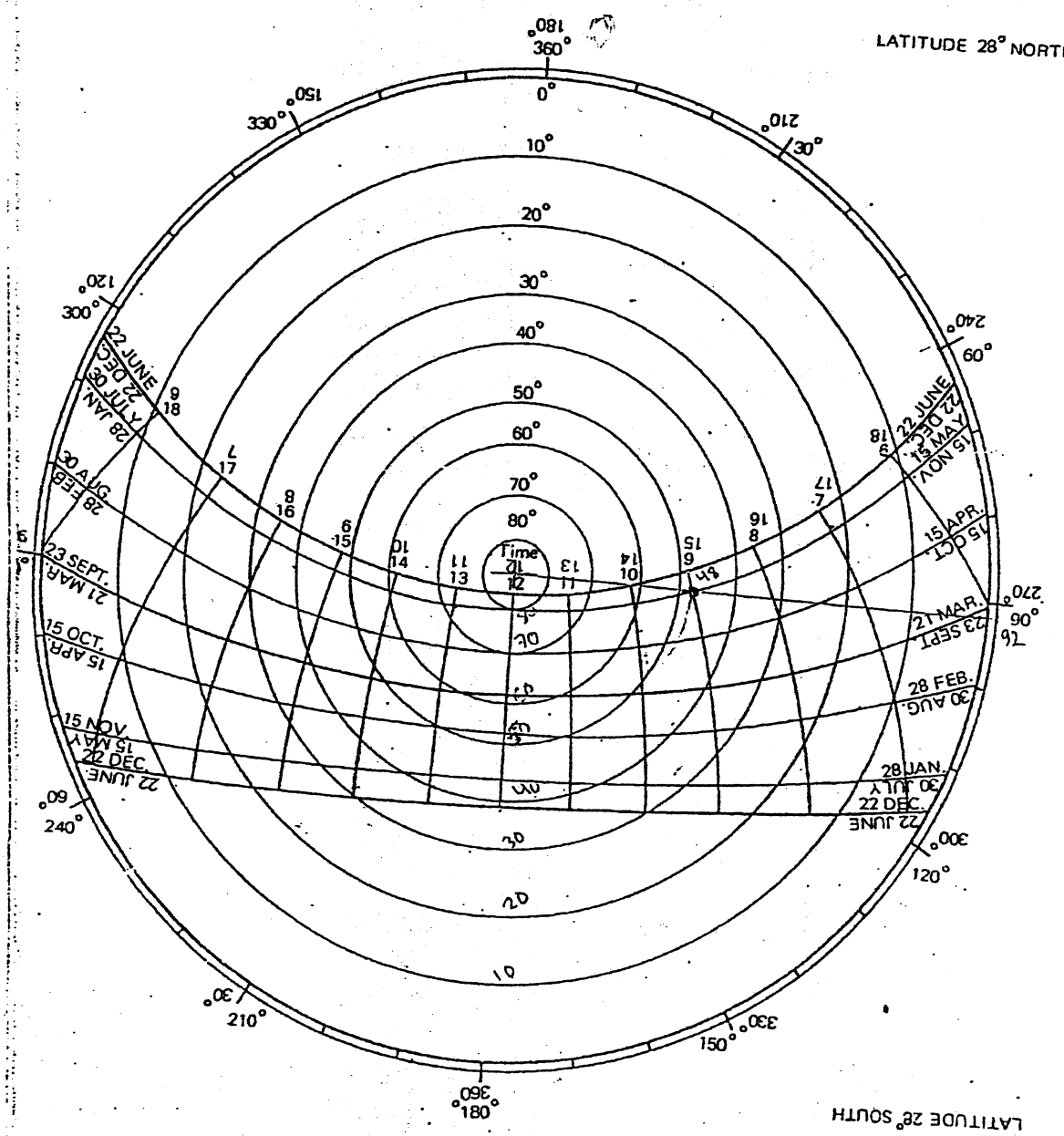

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

Exam.	Regular / Back		
Level	BE	Full Marks	80
Programme	B.Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt any Eight questions.*
- ✓ *The figures in the margin indicate Full Marks.*
- ✓ *Necessary Solar Chart is attached herewith.*
- ✓ *Assume suitable data if necessary.*

1. Write the absorption and reflection of solar radiation by the earth with the help of sketch. Describe the solstice and equinox condition with the help of sketches. [5+5]
2. Write the characteristics of climate in Terai region of Nepal. Describe with the help of sketches and examples, the main design criteria for shelter in terai region of Nepal. [3+7]
3. It is required to cover a window of 1.65m height against direct sunlight by a horizontal louvre fixed 150mm above the upper edge of the window. What should be the effective projection of the louver in front of the wall? The wall is facing SE at given latitude. The full coverage is to be obtained at 9.00 A.M. on 21 June. [10]
4. Write short notes on: (any two) [5+5]
   a) Objectives of climatology
   b) Shadow angle and its uses
   c) Urban climate
5. a) Find the U-value of the composite wall section assuming the following. [7]
      i) External surface resistance, $1/f = 0.076\ m^2°c/W$
      ii) Conductivity of brick work 230mm thick, $K = 1.15\ W/m°c$
      iii) Air cavity resistance 50mm thick, $R = 0.176\ m^2°c/W$
      iv) Conductivity of plaster 12mm thick, $K = 0.461\ W/m°c$
      v) Internal surface resistance, $1/f = 0.123\ m^2°c/W$

      Draw the typical section of the composite wall.

   b) Calculate the rate of heat flow through the wall if the wall is 3m high and 6m long. The temperature of inside wall is 22°C and outside is 40°C. [3]
6. Describe importance of building by-laws in architecture and urban planning with respect to climate. Write the recommendation to improve the by-laws of Kathmandu. [5+5]
7. Describe with the help the sketches, design and construction of earthquake resistant buildings in Nepal. [10]
8. a) Write about the thermal transmittance, conductance and resistance. [3]
   b) Explain with the help of sketches, heat loss and heat gain factors in a building. [7]
9. a) Write about the system of ventilation. [3]
   b) Explain effect of wind movement with respect to building shape and layout. [7]
10. Write short notes on: (any two) [5+5]
    a) Time lag and decrement factor
    b) Egg-crate shape shading device
    c) Wind rose

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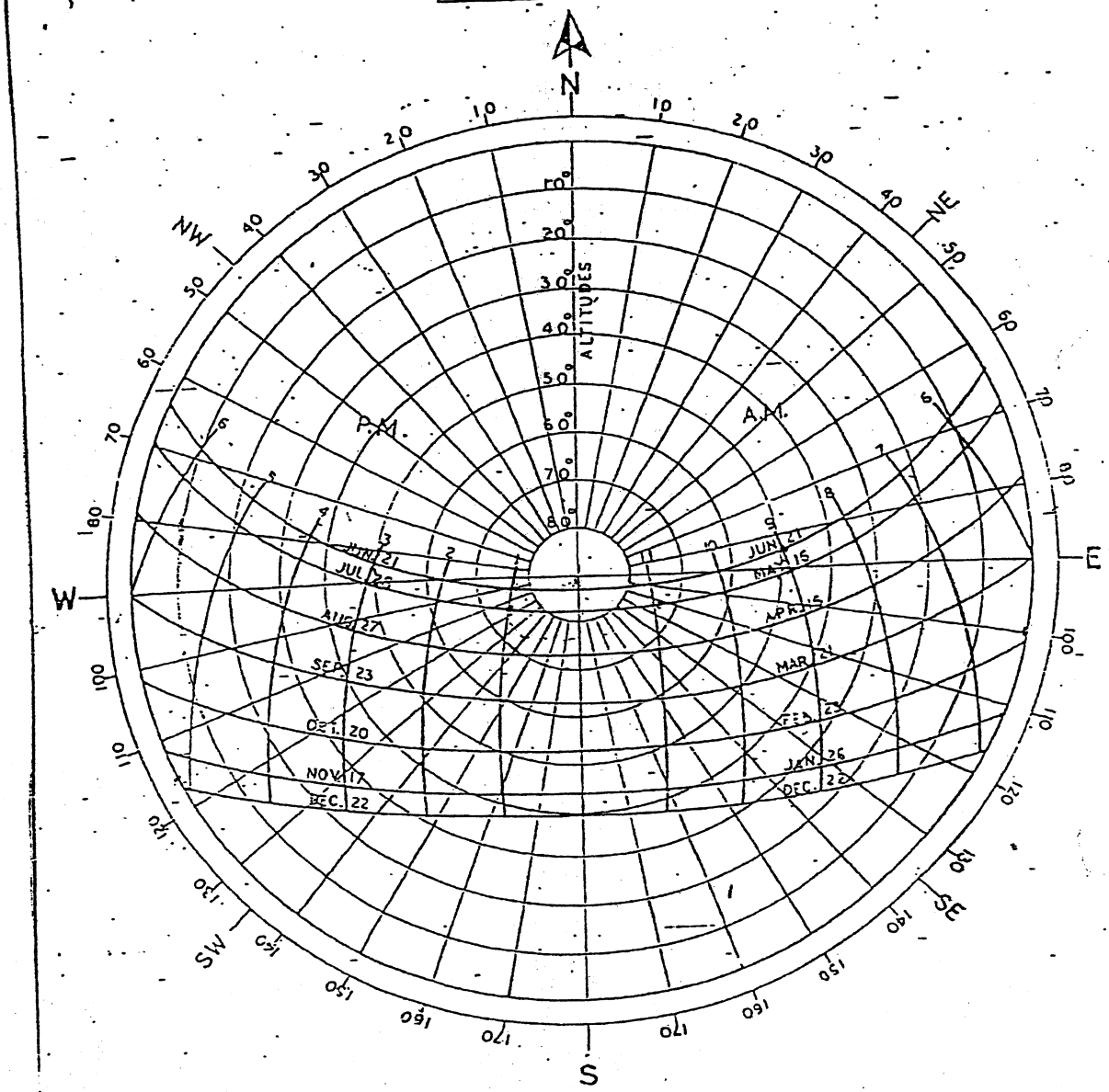
SOLAR CHART



LATITUDE 27° NORTH

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12 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	B. Arch.	Pass Marks	32
Year / Part	II / I	Time	3 hrs.

Subject: - Building Science I *(AR 506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. a) Explain the Macro and Micro climate. Illustrate the sketches to show the amount of solar radiation received by the earth and type of solar radiation that strikes the building. [10]

   b) Describe with the help of sketches and examples, the solar radiation control techniques for the building design in hot climate. [10]

2. Determine the U-value of a 350 thick plastered stonework in cement mortar with both side 25mm cement plastered assuming the following: [20]

   a) Conductivity of stone work — ks = 1.295 W/m°C
   b) Conductivity of cement plaster — kc = 0.16 W/m°C
   c) Internal Surface Resistance — 1/Fi = 0.123 m^2°C/W
   d) External Surface Resistance — 1/F0 = 0.053 m^2°C/W

   Also calculate the rate of heat flow through the wall if the wall is 4m high and 7m long. The temperature of inside wall is 23°C and outside is 42°C. Draw the typical section of composite wall.

3. a) Explain with the help of sketches, heat loss and heat gain factors in a building. [5]

   b) Find the following values on 21 June 9 a.m for south facing wall in Kathmandu.

   i) Solar altitude angle
   ii) Solar azimuth angle
   iii) Wall azimuth angle
   iv) Horizontal shadow angle
   v) Vertical shadow angle
   vi) Angle of incidence
   vii) Horizontal component of Angle of incidence

   Draw the necessary sketches. [10]

4. a) Describe importance of building by-laws in architecture and urban planning. [5]

   b) Write the drawbacks and recommendation to improve the building by-laws of Kathmandu. [10]

5. Describe the shelters of Nepal and world in hot and climate zones. [10]

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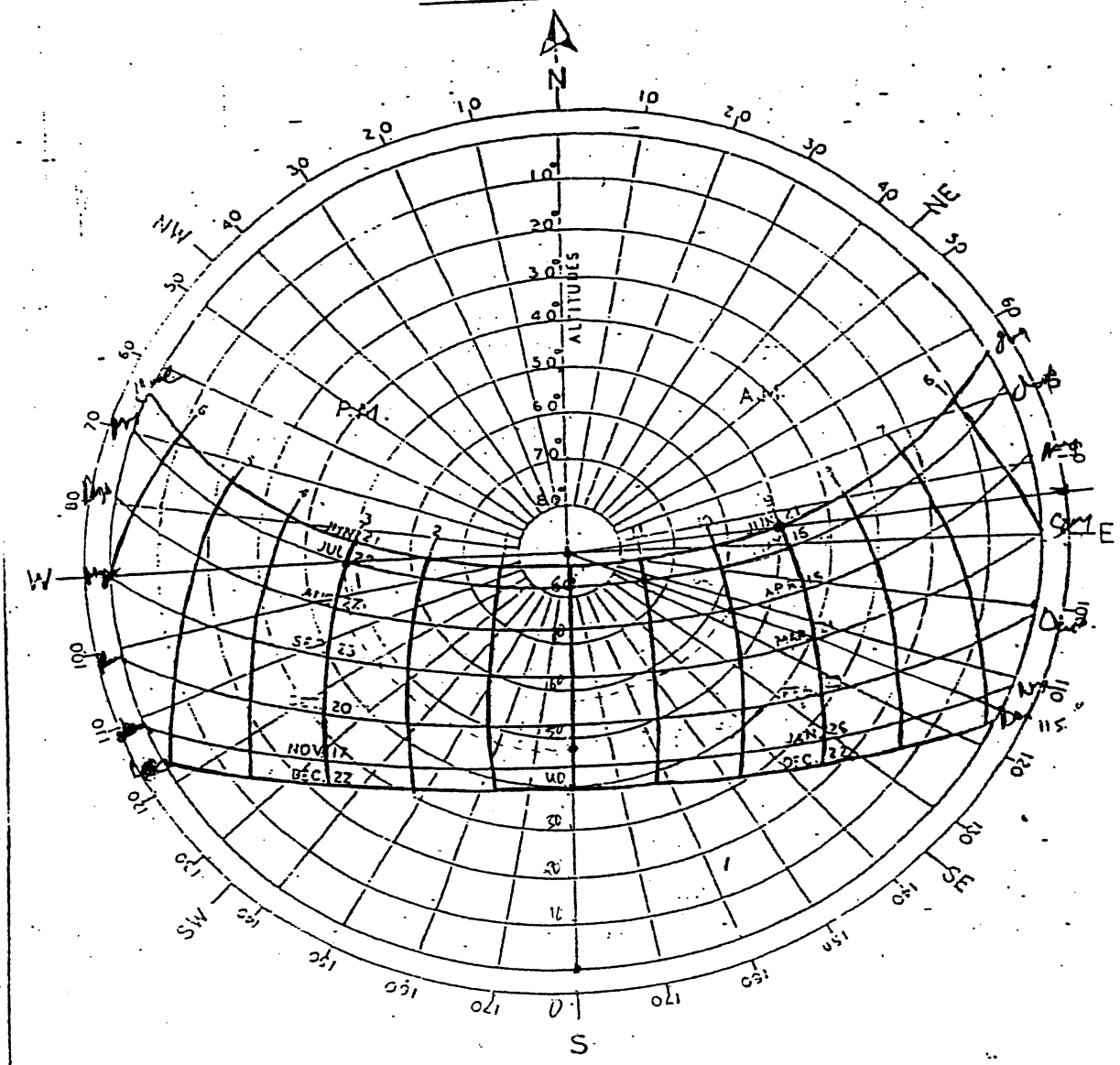
SOLAR CHART



LATITUDE 27° NORTH

Exam	ASSESSMENT (2017)		
Level	Arch	Full Marks	60
Program	Arch	Pass Marks	24
Year /Part	II/I	Time	2 HRS

Engineering College

01.12.073

Subject: Building Science –I

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.
The figure in the margin indicates full marks.
Attempt ALLquestions.

1. Illustrate the sketches to show the amount of solar radiation received by the earth and type of solar radiation that strike the building. **(8)**
2. Discuss with neat diagram, the solar geometry with the sun as the center. Write the characteristics of Hot-Arid climate. Describe with examples, the main design criteria appropriate for shelters in Hot-Arid climate, and draw neat and clean sketches to support your answer. **(8)**

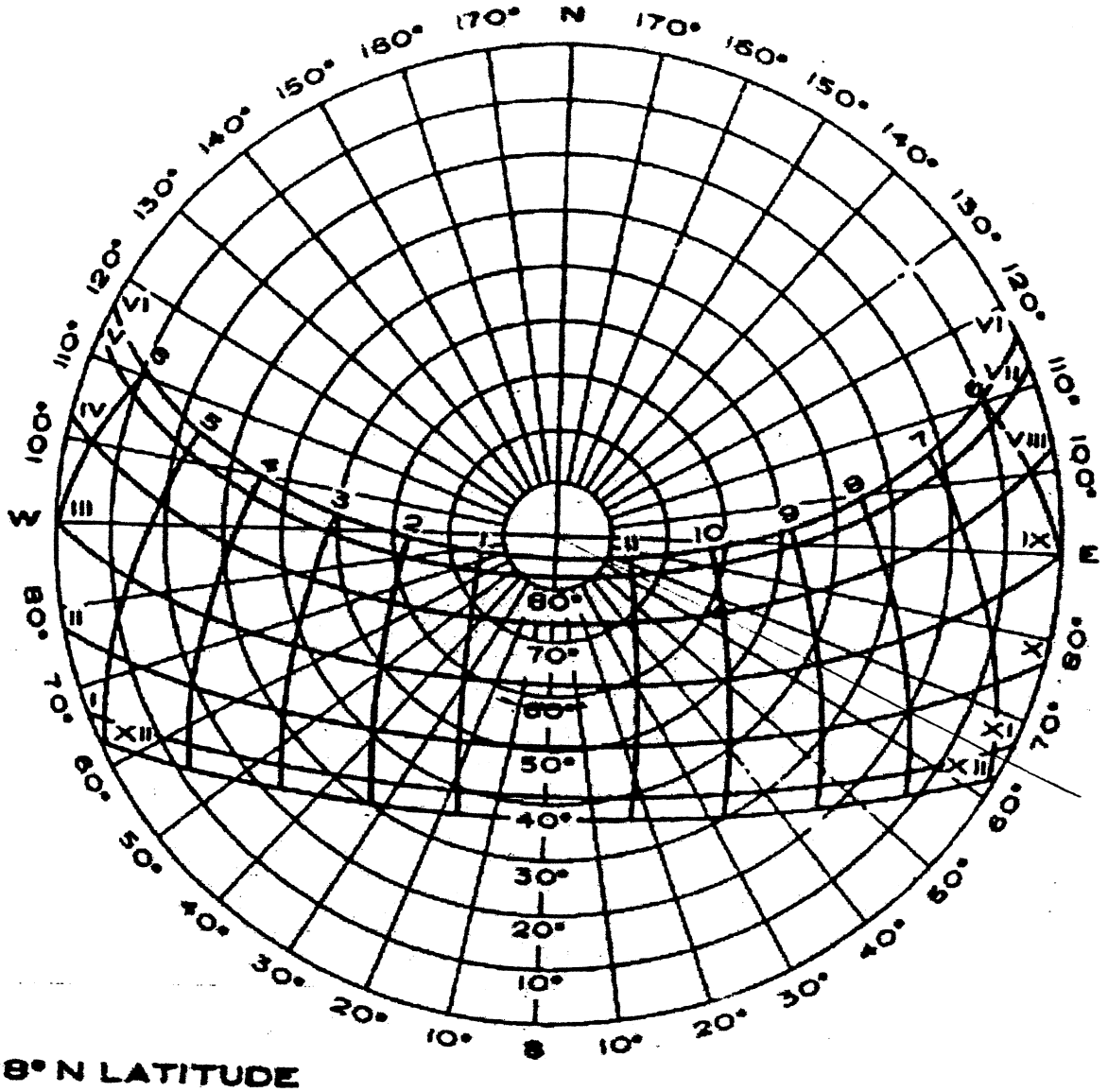
3.
   a) What do you understand by time-lag and decrement factor? **(5+5)**
   b) Determine the U-value of 350mm thick stonework with both side 25 mm cement plaster assuming the following:
      Conductivity of stone work (k_s) = 1.295 W/m°C
      Conductivity of cement plaster (k = 0.16 W/m°C
      Internal surface resistance ($1/f_i$) = 0.123 $m^{2o}C/W$
      External surface resistance ($1/f_o$) = 0.053 $m^{2o}C/W$
      Show wall section with the dimensions.
      If the area of the wall is 15m^2, find the heat gain through the wall if the outside temperature is 20°C and inside temperature is 10°C. **(10)**

4. It is required to cover a window of 1.2 m (4 feet) high and 1.8 m (6 feet) long against the sunlight by a horizontal projection fixed 100 mm above the upper edge of the window. What should be the effective projection in front of the wall? The wall is facing southeast in Pokhara. Full coverage is to be obtained at 10 a.m. on 15 April. **(10)**

5. a) Write the historical background of Earthquake disaster in Nepal.**(4)**

   c) Describe with the help of the sketches to design and construction of earthquake resistance building in Nepal? **(10)**

ALL THE BEST!!!!



28° N LATITUDE

ENGINEERING COLLEGE

Examination Division

2072, 1st Chaitra

Examination	Assessment	Full Marks	60
Program	B.Arch.	Pass Marks	24
Year /Part	II/I	Time	2 hrs

Subject:-Building Science I

Attempt **All** questions.
Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate **Full Marks.**

1. It is required to cover a SE facing window of 1.65m high against direct sunlight by a horizontal louver fi 150mm. above the upper edge of the window. What should be the effective projection of the louver in 27° latitude. The full coverage is to be obtained at 9:00 A.M on 21st June. Draw the necessary sketches. **(10)**

2. Determine the U-Value of the following composite wall.
   a. Gypsum plaster – 12mm (kgp) = 0.461 W/m°C
   b. Brickwork – 350mm (kbw) = 1.15 W/m°C
   c. Conductivity of air cavity (kac) = 0.026 W/m°C
   d. Brickwork – 350mm (kbw) = 1.15 W/m°C
   e. Internal surface resistance (1/fi) = 0.123 m^2°C/W
   f. External surface resistance (1/fo) = 0.055 m^2°C/W

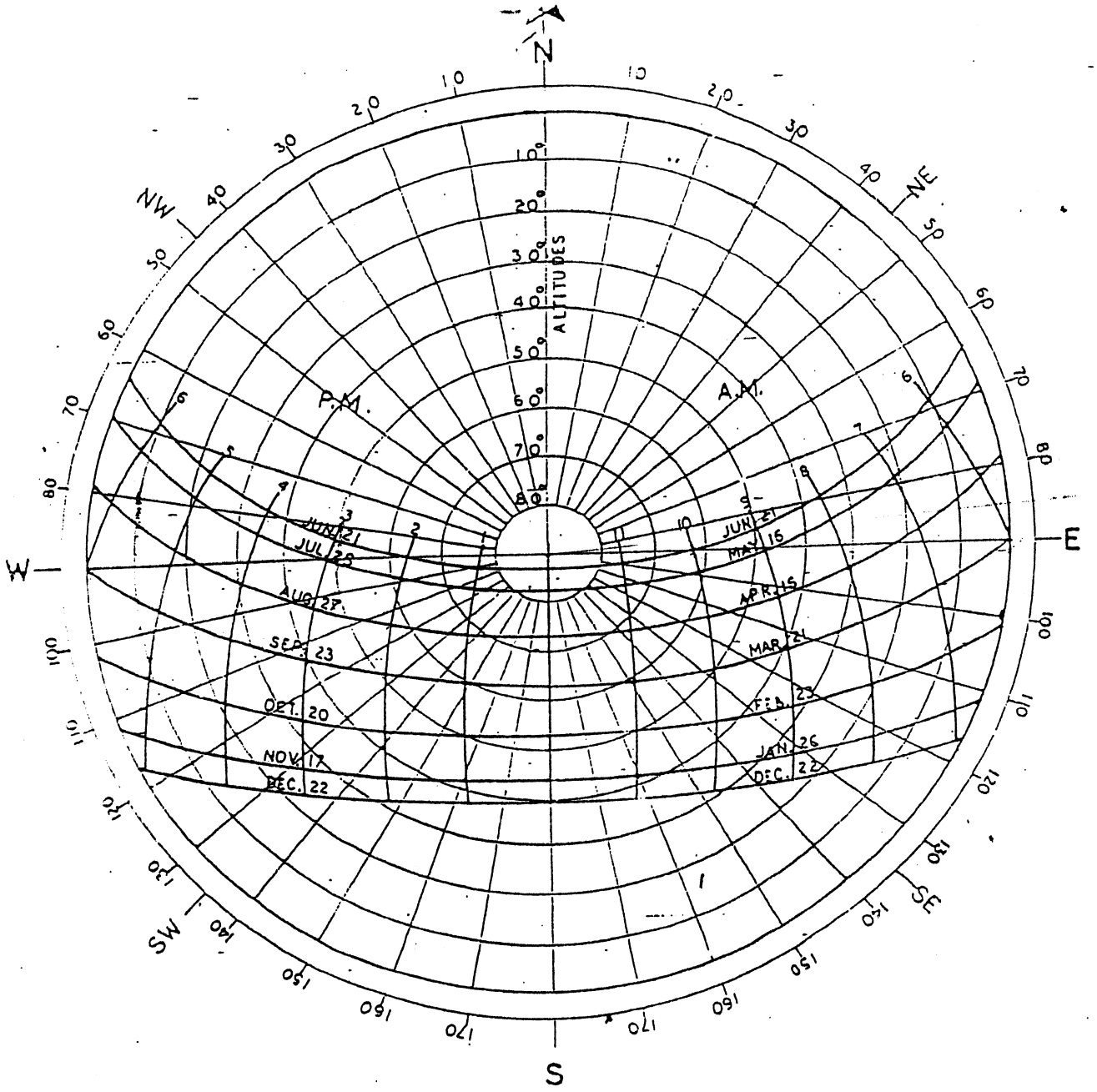
   Draw the typical section of the composite wall. If the area of the wall is 30m^2, find the heat gain through the wall the outside temperature is 20°C and inside temperature is 10°C. **(10)**

3. Define the characteristics of climate in mountain region in context of Nepal. Explain about the criteria for designi buildings and urban spaces in mountain region. **(3+7)**

4. Describe the various design and construction techniques of earthquake resistant buildings. Illustrate withsketches. **(10)**

5. Write Short notes on: (any four) **(5*4)**
   a. Urban climate
   b. Wind rose diagram
   c. Time lag and decrement factor
   d. Condensation & Humidity
   e. Thermal balance in a room

ALL THE BEST



LATITUDE 27° NORTH

Engineering College

15.08.073

Exam		ADT I	
Level	Arch	Full Marks	20
Program	Arch	Pass Marks	8
Year /Part	II/I	Time	45mins

Subject: Building Science –I

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.
The figure in the margin indicates full marks.
Attempt all the questions.

1. Relation between Climate and Architect. What are the various climatic factors that make up a climate? Explain with necessary details and sketches (3+7)

2. Write short notes on: (5+5)
   a) Wind rose
   b) Urban climate

ALL THE BEST!!!!

Exam		ADT (2017)	
Level	Arch	Full Marks	20
Program	Arch	Pass Marks	8
Year /Part	II/I	Time	45mins

26.10.2073

Subject: Building Science –I

Candidates are required to give their answers in their own words as far as practicable.
Use necessary sketches to illustrate your answer as far as possible.
The figure in the margin indicates full marks.
Attempt all the questions.

1. What are the effects of wind movements due to various building lay-outs, openings, roof, height, width etc? You have to draw the various patterns and flow of wind according to the above formats. (10)

2. Write short notes on the design criteria of the following: (any two) (5+5)
   a) Hot arid climate
   b) Hilly region of Nepal
   c) Cold climate

ALL THE BEST!!!!